Using the National Food and Nutrition Survey (NATFAN) to Examine WIC Participant Food Choices and Intakes Before and After Changes in the Food Benefit

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Abstract

This project involved the execution of data sharing agreements and preparation of a publically accessible database and summary reports for the National Food and Nutrition Study (NATFAN). NATFAN used repeated cross-sectional surveys conducted in WIC clinics between 2009 and 2011, before and after the changes in the WIC food benefit, to examine dietary practices. Women who attended WIC clinics during the periods of the two surveys completed questionnaires about their own (Women questionnaire), their child's (Child questionnaire), or their infant's (Infant questionnaire) consumption of certain foods related to the changes in the WIC food package. Reports on food consumption for milk, grains, fruits and vegetables, beverages, and baby foods include data from the 39 State WIC Programs and consolidated data from 10 Indian Tribal Organization WIC Programs before and after the WIC changes. The data dictionary and code book and the public dataset include data from all participating WIC programs.

Keywords: WIC; Revised Food Packages; NATFAN: Food Choices; Special Supplemental Nutrition Program for Women, Infants, and Children; Food Benefits

This study was conducted by Institute for Obesity Research and Program Evaluation at Texas A &M University under a cooperative research contract with USDA's Economic Research Service (ERS) Food and Nutrition Assistance Research Program (FANRP): contract number 59-5000-1-0060 (ERS project representative: Elizabeth Frazão). The Institute for Obesity Research and Program Evaluation was responsible for reviewing the report. The views expressed are those of the authors and are not necessarily those of ERS or USDA.

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Using the National Food and Nutrition Survey (NATFAN) to Examine WIC Participant Food Choices and Intakes Before and After Changes in the Food Benefit

Final Report
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By
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Project Team:
Carol Spaulding, Peter Murano, Asha Girimaji, Kimberly Paulhill and Yan Li

Institute for OBESITY Research and Program Evaluation

Contents

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Disclaimer: This study was conducted by Institute for Obesity Research and Program Evaluation at Texas A &M University under Cooperative Agreement/Grant # 287 with the USDA's Economic Research Service (ERS). The Institute for Obesity Research and Program Evaluation was responsible for reviewing the report. The views expressed are those of the authors and are not necessarily those of ERS or USDA.

Executive Summary

This project involved summarizing and preparing preliminary analyses for the NATFAN study of consumption of foods related to the changes in the WIC food package for women, infants, and children. During the period of the project, we produced one manuscript which was submitted for publication, developed summary reports on five key questions generated by an Advisory Panel of State and Indian Tribal Organization WIC directors, produced a data dictionary and code book for the NATFAN data set, established a website for storage of the public data, and initiated three additional manuscripts to be submitted to peer-reviewed journals. We obtained technical reviews of this report from experts outside and within Texas A&M and made revisions consistent with their recommendations.

In preparation for making the NATFAN data set publically available, we secured data sharing agreements from 38 of the 39 State WIC Agencies that participated in the NATFAN surveys, with one State WIC Agency agreement pending signature at the time of this report. Links to the data dictionary and code book and the data files may be found at http://orin.tamu.edu/research/natfan/. The public data files, described in detail in the data dictionary and code book, allow for individual- and state-level analysis of the NATFAN results but do not contain personally identifiable information.

In the following sections, we provide summaries of the key findings from the food reports and the data dictionary/codebook for the NATFAN project.

Milk (*Is the change in milk vouchers to lower- fat milks associated with a change in the consumption of 1%, 2% and whole milk?)*

This report provides information about milk consumption for 23,467 women and 41,883 children aged one through four who had received WIC foods in the past 30 days. Women attending WIC clinics during the survey periods responded to questions about their own (Women questionnaire) or their child's (Child questionnaire) dietary practices, including the amount, kind, and fat content of milk consumed. Demographic characteristics for the study participants before and after the changes were similar for both the Women and the Child questionnaire respondents. Cow's milk was drunk by almost all women and children who drank milk. Results indicated little change in the amount of milk consumed by women or children following changes in the WIC food benefit, with substantial reductions in the percentages of both women (from 35% to 17%) and children (from about 38% to about 15%) who drank whole milk. There were corresponding increases in the proportions of women and children who drank lower-fat milk, with minimal consumption of skim milk or soy milk before and after the food package changes.

Whole and refined grain products (How often do WIC participants choose whole grain products?)

This report describes grain product consumption reported for 17,583 women and 38,765 children aged one through four, who had received WIC foods in the past 30 days and responded to questions about grain consumption. Women attending WIC clinics during the survey periods responded to questions about their own (Women questionnaire) or their child's (Child questionnaire) dietary practices, including the frequency and type of refined or whole grain foods consumed. Demographic characteristics for the study participants before and after the changes were similar for both the Women and the Child questionnaire respondents. Results indicated higher percentages of women and children were consuming 100% whole wheat bread, whole wheat tortillas and brown rice once a week or more after the food package changes. Slightly lower percentages were consuming white bread, white rice and flour tortillas once a week or more after the food package changes. Among the whole grain foods considered in the NATFAN surveys, the highest number and largest percentages of participants reported that they were consuming 100% whole wheat bread one or more times a week after the food package changes.

Fruits and vegetables (Does the introduction of vouchers for fruits and vegetables change the quantity consumed or the variety consumed by women and children?)

Participants were 24,812 women and 42,141 children aged one through four who had received WIC foods in the past 30 days and reported on their fruit and vegetable consumption. Women attending WIC clinics during the survey periods responded to questions about their own or their child's dietary practices concerning the frequency of consumption and kinds of fruits and vegetables consumed. Demographic characteristics for the study participants before and after the revisions were similar for both the Women and the Child questionnaire respondents. Smaller percentages of women and children ate fruit and vegetables once a day or less, and higher proportions ate fruit and vegetables at least twice a day, after the food package changes. These shifts suggested a trend towards increased consumption of fruits and vegetables after implementation of the revised WIC food package, but even after the changes about 40% of the NATFAN women were consuming fruit and vegetables less than once a day. The variety of fruits and vegetables consumed was the same before and after the food package changes.

Infant Baby Foods (*Is the change in the infant food package associated with a change in the age of introduction of complementary foods? Is the introduction of vouchers for specific types of baby food at six months of age associated with increased consumption of fruits and vegetables?)*

Caregivers attending WIC clinics during the survey periods responded to questions about their infants' diets, including the amount, kind, frequency and age of introduction of complementary foods. Responses represented 12,002 infants from birth through11 months of age who had received WIC foods in the past 30 days. Demographic characteristics for the study participants before and after the changes were similar. About 60% of all infants ate complementary foods such as cereal and commercially prepared baby foods. Infant cereal was consumed by almost all infants, and baby food meats were consumed least often. The mean number of jars of baby food consumed per week by infants 6 through 11 months of age was significantly greater for the

survey following the changes. There were decreases in the proportions of infants 6 through11 months of age who were introduced to baby food desserts, dinners and 100% juice, and a slight increase in the consumption of fruit and vegetable commercially prepared baby foods. Consumption of complementary foods by infants 4 months old and younger was reported by small percentages of caregivers before and after the food package changes.

Juice and other beverages ***(****Is the reduction in the quantity of juice available from WIC associated with less juice consumption? In addition, did the reduction in quantity of juice in the WIC package lead to an increase in consumption of other non-nutritive sugary drinks?)*

Respondents included 24,813 women and 40,717 children aged one through four who had received WIC foods in the past 30 days. Women attending WIC clinics during the survey periods responded to questions about their own (Women questionnaire) or their child's (Child questionnaire) dietary practices, including the frequency of consumption of 100% juice, artificially sweetened drinks and sugar sweetened drinks. Summary results did not show a reduction in the frequency of consumption of 100% juice by women and children after the WIC changes. On the other hand, NATFAN results did not reflect increases in the frequency of consumption of artificially sweetened and sugar sweetened beverages by women and children.

Data dictionary and code book *(The data dictionary and codebook provide summary data for all the information in the results in the NATFAN data files. This document aims to help readers understand the data file in terms of the questionnaire, but does not include analysis. The codebook includes information for each variable in the data file.)*

This report provides documentation for data from the National Food and Nutrition survey (NATFAN), a multi-state project to assess changes in WIC participant food and nutrition behavior before and after implementation of the new WIC food package. The data were collected using questionnaires for Women, Infants, and Children, which were administered to participants from State, Territorial, and Indian Tribal Organization (ITO) WIC Programs between 2009 and 2011. During 2009, 39 states and 11 ITOs participated in administering questionnaires in WIC clinics before the food package revisions. The survey was re-administered at least six months following the food package changes, late in FY2010 and early FY 2011, with one additional state and 7 additional Indian Tribal Organization WIC Programs participating. State-level participation in the NATFAN project was voluntary. State WIC Programs in Delaware, Maine, Michigan, Minnesota, New York, North Dakota, Oklahoma, South Carolina and Utah did not participate, and the WIC Program in Ohio participated only in the post-implementation survey. Individual WIC Programs administered surveys using convenience samples of women and caregivers of infants and children who attended WIC clinics during the data collection periods. All study procedures were examined and determined to be exempt from full review by the Institutional Review Board (IRB) of Texas A&M University; some individual state health agencies also made exempt or expedited IRB reviews according to state requirements. All

participants provided consent; survey questionnaires did not include personally identifiable information and non-participation did not affect WIC benefits.

The final NATFAN data sets consists of Excel and SPSS files for the entire survey samples of women, infants, and children, with coding to denote "before" and "after" survey responses. Separate files also exist for each state, territory, and Indian Tribal Organization WIC programs. The data files do not include respondent names or WIC Family Identification numbers. Individual survey responses are identified by a numerical code based on a number assigned when the paper surveys were printed, and these codes are not associated with a particular WIC program or geographic area.

The data set includes responses in which the study participant may not have completed all questionnaire items. Questionnaire respondents included caregivers who may not have been WIC participants themselves, such as foster parents, fathers, and grandparents. Receipt of WIC foods in the last 30 days is an item with yes/no responses in the data set. The variable "State" in the data file contains data from the individual State, Indian Tribal Organizations, and territorial WIC programs. Last, due to the differences in State WIC Program sampling strategies, some states (e.g., Texas and Utah) may be overrepresented and some states (e.g., California) may be underrepresented based on the program's share of National WIC participants compared to its representation in the NATFAN data set. Users of this data set should consider the use of statistical weighting techniques as appropriate.

The NATFAN surveys were developed by expert panels which included representatives of the National WIC Association, several state and local WIC Program Directors, representatives of the United States Department of Agriculture Food and Nutrition Services, and researchers from Texas A&M University. The survey distribution and administration were managed by the Institute for Obesity Research and Program Evaluation, Texas A&M University Department of Nutrition and Life Sciences and Texas Agrilife Research and Extension, under contracts with the Texas Department of State Health Services WIC Program. The data in this report were prepared under a grant from the United States Department of Agriculture, Nutrition and Food Services Program.

Key Food Reports

Milk Consumption by NATFAN Participants Before and After WIC Food Package Revisions

Is the change in milk vouchers to lower- fat milks associated with a change in the consumption of 1%, 2% and whole milk?

Abstract

This report describes milk consumption reported in the National Food and Nutrition Surveys carried out in 49 State and Territorial WIC Programs before and after changes in the WIC food benefit. Participants were 23,467 women and 41,883 children aged one through four who had received WIC foods in the past 30 days. Women attending WIC clinics during the survey periods responded to questions about their own (Women questionnaire) or their child's (Child questionnaire) dietary practices, including the amount, kind, and fat content of milk consumed. Demographic characteristics for the study participants before and after the changes were similar for both the Women and the Child questionnaire respondents. Cow's milk was drunk by almost all women and children who drank milk. Results indicated little change in the amount of milk consumed by women or children following changes in the WIC food benefit, with substantial reductions in the percentages of both women (from 35% to 17%) and children (from about 38% to about 15%) who drank whole milk. There were corresponding increases in the proportions of women and children who drank lower-fat milk, with minimal consumption of skim milk or soy milk before and after the food package changes.

Summary

What is the issue?

The 2009 WIC food package revisions provided less milk and only lower fat (2%, 1%, and ½%) and no fat (skim) milk to women and children two through four years of age, and allowed for some additional milk substitutions. One-year-olds continue to get whole milk in accordance with dietary fat content recommendations for growth. The revisions in the WIC food benefit prompted the following questions: Was there a change in the amount, kind and type of milk consumption by women and children as a result of these revisions? Are WIC women and children (two through four years of age) consuming the lower fat milk? Is the shift towards 2%, 1% or skim milk? Are there any unintended consequences (such as reduction in the amount of milk consumed) as a result of the provision of only lower fat milk?

What did the study find?

In general, the food package changes appear to have shifted consumption towards lower-fat milks, without reducing the amount consumed, for both women and children two to four years of age. The percentage of women drinking whole milk after the changes (17%) was about half of that before the changes (35%). Similar results are seen for children aged two through four, with over 38% drinking whole milk before the changes and about 15% after the changes.

About 1/3 of women drank 2 cups or less of milk per day, while over half of children aged two to four drank three or more cups of milk daily, both before and after the food package changes. The percentage of 1-year-olds drinking whole milk was higher following the changes, with a corresponding decrease in the percentage drinking 2% milk. The policy changes appear to have increased the consumption of lower-fat milks among women and children two to four years old, without impacting the amount consumed.

How was the study conducted?

This report uses results from NATFAN surveys of women and children, to examine the impact of the food package change on the quantity, type, and fat content of milk consumed by women and children. The NATFAN study was conducted with WIC participants in 49 State and Indian Tribal Organization WIC Programs before and after the revision of the food package in 2009. To produce this report, we used completed NATFAN questionnaires representing women and children aged one through four years who had received WIC foods in the past 30 days. We provide summary tables and demographic information for responses representing 22,266 women and 39,017 children for whom milk consumption was reported by amount and type. Since the dietary recommendations and WIC food packages are different for 1-year-old children and children aged two and older, we report on children in these two age groups separately.

Introduction

Revisions to the WIC food packages: milk for women and children

Prior to the 2009 WIC food benefit changes, there were no restrictions on the fat content of milk in the food packages. The food package revisions reduced the amounts, changed the types of milk provided, and allowed for additional substitutions for milk products provided to women and children participating in the WIC program.

Amounts of milk. The amount of milk provided to WIC children was reduced from 24 quarts to 16 quarts. The amounts of milk for women were reduced from 28 quarts to 24 quarts for pregnant women, from 24 quarts to 16 quarts for postpartum women, and from 28 quarts to 24 quarts for women who are exclusively breastfeeding their infants.[1]

Milk by type. The new food package allows for the provision of reduced fat (2%), low fat (1% and ½ %), or fat free types of milk to women and children two through four years of age, but no longer includes whole milk.[1] WIC continues to provide whole milk to one year olds in accordance with recommendations from the American Academy of Pediatrics, to meet the growth needs of this age group.[2] State WIC agencies were given the flexibility to choose whether they would continue to offer 2% milk, or include only 1% and skim milk, in the food packages for pregnant, postpartum or lactating women and for children aged two through four years. According to a USDA report[3], six states (Iowa, Maryland, New Hampshire, New York, Rhode Island, and Vermont) and a few Indian Tribal Organization WIC programs chose the option of providing only 1% or skim milk to women and children over age two.

Milk substitutions. In addition to the changes in amounts and types of milk provided, the new food package allows for additional substitutions. Cheese may be substituted for milk for children at the rate of 1 pound of cheese per 3 quarts of milk, with medical documentation required for substituting more than 1 pound of cheese for milk. Also, soy-based beverage and calcium set tofu may be substituted for milk with medical documentation. For women, cheese may be substituted for milk at the rate of 1 pound of cheese per 3 quarts of milk, with no more than 1 pound of cheese. Soy-based beverage may be substituted for milk at the rate of 1 quart of soy based beverage for 1 quart of milk, and calcium set tofu can be substituted for milk at the rate of 1 pound of tofu per 1 quart of milk.[4]

Dietary recommendations for milk

The Dietary Guidelines for Americans (DGA) include consumption of low fat or fat free milk as a part of an overall healthy diet for everyone over 2 years of age, while the American Academy of Pediatrics recommend whole milk for one- year-olds. Two cups of the dairy group are recommended daily for children one year of age and above and 3 cups/day for adults.

These recommendations for dairy products include milk, cheese, yogurt, cheese, soymilk and milk based desserts. In general, 1 cup of milk, yogurt, or soymilk, 1 ½ ounces of natural cheese or 2 ounces of processed cheese can be considered as 1 cup from the dairy group.[5] The DGAs do not contain specific provisions that address the eligible groups represented in WIC – pregnant, lactating, or postpartum women and children who are at nutritional risk.

WIC participant and U.S. milk consumption

Studies conducted prior to the WIC food package changes reflected that women and children mostly drank whole milk or to some extent 2% milk but rarely drank 1% or skim milk [6,7] and consumed less than the recommended amounts of milk, [8,9] although a California study [10] found that nutrition education interventions were effective in influencing WIC participants' selection of lower fat milk. Almost universal consumption of cow's milk was noted among a national random sample of WIC toddlers.[11] Since introduction of the new food package, studies have reported improved availability of lower-fat milks in stores, [12,13] increased consumption of lower-fat milk and decreased consumption of whole milk.[14]

Lactase maldigestion associated with some ethnic and racial populations including African Americans, Hispanic Americans, American Indians, and Asian Americans has been suggested as a factor influencing milk intake.[15] Milk consumption among adult WIC participants has been found to differ by race and ethnicity, with white women drinking more milk than African Americans and other minority women[7]. In general, consumption of whole milk in the United States has steadily decreased since the 1940s; but despite drinking less whole milk, Americans have not increased their consumption of lower-fat milk since the early 1990s.[16] Changing the WIC food benefit for milk stood to have an immediate and direct impact upon consumption.

The objective of this report is to describe the amounts and types of milk consumed by women and children who participated in the National Food and Nutrition Questionnaire (NATFAN), a repeated cross-sectional survey of WIC participants that was administered before and after revisions to the WIC food package. This report provides participant demographic characteristics, descriptive statistics and summary tables to determine whether the change in milk vouchers to lower- fat milks was associated with changes in the consumption of 1%, 2% and whole milk.

Methods

Participants and inclusion criteria

This report includes responses representing the 49 State and Indian Territorial Organization WIC programs that participated in NATFAN surveys before and after changes in the food package; participants who completed the Women questionnaire reported on their own dietary practices and those who completed the Child questionnaire reported on their child's dietary practices. The total study samples included 29,165 women (Women questionnaire) and caregivers of 46,419 children aged one through four (Child questionnaire). In this report we describe reported milk consumption for 22,266 women and 39,017 children who had received WIC foods in the past 30 days and who provided complete and consistent responses to demographic items and questions about milk quantity, kind, and milk fat type. Since the dietary recommendations for milk are age– specific for children, we report results for children in two categories: 1-year-olds and two- through 4-year-olds. The age categories for children include 11,794 1-year-olds and 27,223 children aged two through four.

Definitions: questionnaire items used

Milk Quantity. We determined the numbers and percentages of women, 1-year- old, and two- through 4-year-old children from each survey wave (before and after the WIC food package revisions), who reported daily milk consumption amounts in responses to the questions "*How many cups of milk do you* (women questionnaire) */does your child* (child questionnaire) *drink in a day?*" The response options were: *I do/ my child does not drink milk, less than 1 cup, 1 cup, 2 cups, 3 cups,* or *4 or more cups.*

Kind of Milk. To determine the kind of milk most often consumed by women, 1-year-olds, and two- through 4-year-old children before and after WIC food package revisions, we used responses to the questions, "*What kinds of milk do you* (women questionnaire)/*does your child* (child questionnaire) *drink most often*?" The response options were: *cow's milk, lactaid or lactose free, soy milk, goat's milk,* or *rice milk.*

Type of Cow's Milk. For type of cow's milk consumption, we used the numbers and percentages of women, 1-year-olds, and two to 4-year-old children before and after WIC food package revisions, who answered the following questions about different types (fat-content levels) of cow's milk: "*What type of cow's milk do you* (Women questionnaire) /*does your child* (Child questionnaire) *drink most often*?" The response options were: *whole milk, 2% milk, 1% milk, ½% milk, skim milk,* or *I DO NOT know*.

Results

Women

We used responses to the question about milk quantity to determine what proportion of women drank milk. As seen in Table 1, almost all women (97%) drank at least some milk daily, both before and after the WIC food benefit changes. The percentages of women who drank milk were above 90% for all race/ethnic groups, with slightly lower percentages of Black women drinking milk before and after the changes.

Table 1. Percent of Women NATFFAN Participants Who Drank Milk According to Race/Ethnicity (N = 29,165) *

	Before		After	
Race/Ethnicity	(n = 13,356)		(n = 14,895)	
	n	%	n	%
White	5,528	97.24	5,813	97.58
Hispanic	4,800	97.50	5,719	97.36
Black	1,660	94.69	1,971	92.84
Others	1,368	96.68	1,392	97.00

** Missing and "do not drink milk" responses are not included in the table.*

Demographics. To examine milk consumption in more detail, we included only responses from women in the NATFAN study who indicated they drank milk, responded consistently to all of the questions relating to milk consumption, provided complete demographic information, and had received WIC foods in the past 30 days. Table 2 provides characteristics for these women.

Table 2. Demographic Characteristics for Women NATFAN Participants Who Reported on Milk Consumption Before and after the Food Package Changes (n=22,266).*

Demographic Characteristic	Before (n = 10,336)		After (n = 11,930)	
Mean age (*SD*)	25.3	(*6.13*)	25.4	(*6.48*)
	n	%	n	%
Race**				
White	4,124	39.9	4,798	40.2
Hispanic	3,834	37.1	4,537	38.0
Black	1,343	13.0	1,525	12.8
Others	1,035	10.0	1,070	9.0
Education**				
Less than high school	3,084	29.8	3,399	28.5
High school and GED	3,478	33.6	3,913	32.8
At least some college	3,220	31.2	3,828	32.1
College graduates	554	5.4	790	6.6
Language spoken at home				
English	6,978	67.5	7,868	66.0
Both Spanish and English	1,365	13.2	1,744	14.6
Spanish	1,817	17.6	2,161	18.1
Other	176	1.7	157	1.3
Pregnancy status***				
Pregnant	4,196	40.6	4,711	39.5
6 months or less postpartum	4,597	44.5	5,097	42.7
Breastfeeding	2,235	21.6	2,601	21.8

* *Missing responses are not included in the table.*
*** "Race" and "Education" categories were consolidated from multiple response options.*
**** Separate questionnaire items; totals do not equal 100% because women may have answered "yes" to more than one of these items.*

The distributions for age, race, currently pregnant, and currently breastfeeding women were similar for the women who reported on their milk consumption in the surveys before and after the food package changes. While the differences in distributions of educational level, language spoken at home, and women who were 6 months or less postpartum were statistically significant, the differences for each category were small (all less than two percentage points) and do not appear to be meaningful in regard to their possible effects on milk consumption.

Amount of milk consumed by Women

Q17. How many cups of milk do YOU drink in a day?

As noted earlier, almost all NATFAN women who responded to this item drank at least some milk each day. Table 2 summarizes daily milk consumption for women.

Table 3. Amount of Milk Consumed by Women in NATFAN Study Before and After the WIC Food Package Revisions (n = 22,266)

Amount consumed	Before (n = 10,336)		After (n = 11,930)	
	n	%	n	%
Less than 1 cup	1,185	11.5	1,521	12.7
1 cup	2,595	25.1	3,155	26.4
2 cups	3,570	34.5	4,128	34.6
3 cups	2,030	19.6	2,132	17.9
4 or more cups	956	9.2	994	8.3

There was little difference in the amounts of milk consumed by women before and after the food package changes; consumption patterns of potential nutritional concerns are evident in the percentages of women who drank less than 1 cup or 4 or more cups of milk per day.

Kind of milk consumed by Women

Q18. ***What kind of milk do YOU drink most often?*** and **Q19.** ***What type of cow's milk do YOU usually drink?***

Table 4 illustrates that over 90% of women who drank milk reported that they drank cow's milk, before and after the food package changes. Less than 5% of NATFAN participants drank lactose-free milk, with no change following the food package revisions. Soy milk, which was added to the new food package as an optional milk substitute by a number of State WIC Programs, was rarely consumed by NATFAN respondents before or after the changes.

Table 4. Milk Consumption by Kind for Women in NATFAN Study Before and After the WIC Food Package Revisions (n = 22,266)

	Before (n = 10,336)		After (n = 11,930)	
Kind of milk	n	%	n	%
Cow's milk	9,687	93.7%	11,179	93.7%
Lactaid or lactose free	419	4.1%	492	4.1%
Soy milk*	188	1.8%	221	1.9%
Goat's milk*	11	.1%	11	.1%
Rice milk**	31	.3%	27	.2%

* *Not a WIC food before changes – soy added at State option by 37 WIC State Agencies and most ITOs in new food packages.*

***Not a WIC food before or after changes.*

Type of milk consumed by Women

Consumption of cow's milk according to fat content was significantly different following the changes in the WIC food package, with a much smaller percentage of women drinking whole milk following the change. Table 5 shows correspondingly higher percentages of women drinking 2% and 1% fat cow's milk following the changes, with little difference in the percentages of women that drank ½% fat or skim milk, or did not know what type of milk they drank.

Table 5. Fat content of Cow's Milk Consumption Before and After the WIC Food Package Revisions Among Women Who Reported Drinking Cow's Milk (n = 20,857)*

Fat content	Before (n =9,681)		After (n = 11,176)	
	n	%	n	%
Whole milk	3,391	35.0	1,897	17.0
2% milk	4,750	49.1	6,726	60.2
1% milk	926	9.6	1,770	15.8
½% milk	20	.2	26	.2
Skim milk	528	5.5	734	6.6
I do not know	66	.7	23	.2

*9 inconsistent responses do not appear in table.

Children

Among all NATFAN children who had received WIC foods in the last 30 days, over 98% drank milk both before and after the WIC food benefit changes. As seen in Table 6, the percentages of children who drank milk were above 95% for all race/ethnic and child age groups, with the exception of Black 1-year-olds. The percentages of Black two-through four-year-olds who drank milk were slightly lower than the proportions for other ethnicities.

Table 6. Child NATFFAN Participants Who Drank Milk According to Race/Ethnicity (N =46,419) *

Race/ Ethnicity	Child age							
	1 Year old				2 - 4 Years old			
	Before (n = 6,688)		After (n = 7,094)		Before (n = 15,441)		After (n =16,583)	
	n	%	n	%	n	%	n	%
White	2,890	96.40	2,959	96.98	7,135	99.15	7,362	99.26
Hispanic	1,894	98.44	2,183	98.82	4,462	99.44	5,178	99.62
Black	1,053	97.05	1,169	96.77	2,026	98.50	2,377	98.84
Others	851	98.04	783	97.15	1,818	99.29	1,666	99.22

* * *Missing and "do not drink milk" responses are not included in the table.*

Demographics

To examine milk consumption, we selected responses for children that included complete and consistent responses to all milk-related and demographic questions for children who had received WIC foods in the last 30 days. Demographic characteristics (see Table 7) for the children represented in the "Before" and "After" surveys were not significantly different for gender distribution or for caregiver educational level for 1-year-olds. Differences in all other child and caregiver characteristics were statistically significant for the two survey groups, but no characteristic differed by more than two percentage points, and we do not believe these differences are meaningful in terms of milk consumption.

Table 7. **Demographic Characteristics of Children** and Caregivers Who Reported on Milk Consumption in the NATFAN Study Before **a**nd After Food Package Changes (n=39,017).

Demographic Characteristics	1 - year olds (n = 11,794)				2 - 4 year olds (n = 27,223)			
	Before (n = 5,804)		After (n = 5,990)		Before (n = 13,417)		After (n = 13,806)	
Children								
Age in months M(*SD*)	16.0	(3.7)	16.3	(3.7)	37.7	(10.2)	38.2	(10.1)
	n	%	n	%	n	%	n	%
Sex								
Boy	3,008	51.8	3,063	51.1	6,909	51.5	7,105	51.5
Girl	2,796	48.2	2,927	48.9	6,508	48.5	6,701	48.5
Caregivers								
Mean age (*SD*)	26.4	*(7.0)*	26.9	*(7.1)*	28.7	*(7.9)*	29.2	*(7.7)*
Race								
White	2,638	45.5	2,610	43.6	6,441	48.0	6,379	46.2
Hispanic	1,582	27.3	1,830	30.6	3,798	28.3	4,238	30.7
Black	876	15.1	945	15.8	1,672	12.5	1,880	13.6
Others	708	12.2	605	10.1	1,506	11.2	1,309	9.5
Education								
Less than high school	1,304	22.5	1,340	22.4	2,865	21.4	2,799	20.3
High school or GED	2,054	35.4	2,070	34.6	4,570	34.1	4,506	32.6
At least some college	2,055	35.4	2,118	35.4	4,900	36.5	5,286	38.3
College graduate	391	6.7	462	7.7	1,082	8.1	1,215	8.8
Language spoken at home								
English	4,313	74.3	4,261	71.1	10,050	74.9	10,049	72.8
Spanish and English	774	13.3	906	15.1	1,708	12.7	1,936	14.0
Spanish	620	10.7	705	11.8	1,457	10.9	1,600	11.6
Other	97	1.7	118	2.0	202	1.5	221	1.6

Amount of milk consumed by one- year-olds and two-through four-year-olds

Q68. How many cups of milk does YOUR CHILD usually drink in a day?

Table 8 provides information about the amounts of milk consumption for 1-year-olds and children aged two through four years who drank milk. For both child age groups, there was little difference in the amount of milk consumed before and after the changes in WIC foods.

Table 8. Amount of Milk Consumed by Children in NATFAN Study Before and After the WIC Food Package Revisions (n = 39,017).

Amount consumed daily	Child Age							
	1 year				2-4 years			
	Before (n = 5,804)		After (n = 5,990)		Before (n = 13,417)		After (n = 13,806)	
	n	%	n	%	n	%	n	%
Less than 1 cup	150	2.6	136	2.3	258	1.9	304	2.2
1 cup	367	6.3	366	6.1	1,385	10.3	1,536	11.1
2 cups	1,317	22.7	1,477	24.7	4,642	34.6	4,845	35.1
3 cups	2,233	38.5	2,229	37.2	4,746	35.4	4,809	34.8
4 or more cups	1,737	29.9	1,782	29.7	2,386	17.8	2,312	16.7

For both child age groups, relatively high percentages of children (30% of 1-year-olds and about 18% of children aged two through four) were drinking four or more cups of milk per day, both before and after the WIC food benefit changes.

Kind of milk consumed by one- year-olds and two-through four-year-olds

Q69. What kind of milk does YOUR CHILD drink most often?

Table 9 illustrates milk consumption by kind for children. Similar to the patterns for women's milk consumption, almost all of the children who drank milk were drinking cow's milk, before and after the changes. About 4% of 1-year-olds were drinking lactose free milk before and after the changes, with slightly smaller percentages of two to 4-year-olds drinking lactose free milk; this consumption pattern was also similar to that of women NATFAN respondents.

Table 9. Milk Consumption by Kind for Children in NATFAN Study Before and After the WIC Food Package Revisions (n = 39,017).

Kind of milk	Child age							
	1 year				2-4 years			
	Before (n = 5,804)		After (n = 5,990)		Before (n = 13,417)		After (n = 13,806)	
	n	%	n	%	n	%	n	%
Cow's milk	5,425	93.5	5,579	93.1	12,781	95.3	13,089	94.8
Lactaid or lactose free	250	4.3	248	4.1	466	3.5	478	3.5
Soy milk*	104	1.8	143	2.4	120	.9	184	1.3
Goat's milk*	15	.3	6	.1	24	.2	26	.2
Rice milk**	10	.2	14	.2	26	.2	29	.2

* *Not a WIC food before changes – soy added at State option by 37 WIC State Agencies and most ITOs in new food packages.*
** *Not a WIC food before or after changes.*

Type of milk consumed by one- year-olds and two-through four-year-olds

Q70. ***What type of cow's milk does YOUR CHILD drink most often?***

Among 1-year-olds (Table 10), over ¾ of NATFAN children drank whole milk and 20% drank 2% milk (not provided by WIC for this age group) before the food package changes. Following the changes, the percentage of 1-year-olds who drank whole milk was higher and the proportion who drank 2% milk was lower.

Table 10. Fat content of Milk Consumed Before and After the WIC Food Package Revisions Among Children Drinking Cow's Milk (n = 36,861)*.

Fat Content	1 year				2-4 years			
	Before (n = 5,420)		After (n = 5,579)		Before (n = 12,774)		After (n = 13,088)	
	N	%	n	%	n	%	n	%
Whole milk	4,121	76.0	4,623	82.9	4,869	38.1	1,982	15.1
2% milk	1,126	20.8	784	14.1	6,137	48.0	8,002	61.1
1% milk	108	2.0	138	2.5	1,213	9.5	2,463	18.8
½% milk	11	.2	2	.0	45	.4	23	.2
Skim milk	30	.6	23	.4	491	3.8	611	4.7
I do not know	24	.4	9	.2	19	.1	7	.1

** 13 inconsistent responses do not appear in table.*

Over 1/3 of two-through four-year-olds drank whole milk before the food package changes. The percentage children in this age group who drank whole milk was much lower following the changes, and the percentages of children who drank 2% or 1% milk were much higher following the changes. Very small percentages of children drank ½ % milk fat milk or skim milk before or after the changes.

Discussion

Women

Among women who drank milk, cow's milk was consumed by over 90% of women NATFAN participants both before and after the 2009 food package change. There was little difference in the amount of milk consumed by women before and after the changes. About one third (36.2%) of NATFAN women reported drinking 1 cup of milk or less per day before the food package changes, and a higher percentage (38.8%) reported drinking 1 cup per day or less following the changes. This milk consumption among NATFAN women was similar to the mean daily consumption of .7 cups of milk for males and females in the National Health and Nutrition Survey 2003 – 2006 [17]. The NATFAN surveys did not include questions about the consumption of other dairy products such as yogurt and cheese that would result in women meeting dietary recommendations for dairy products, but given the additional nutritional needs of women who are receiving WIC foods because they are pregnant, lactating, or 6 months or less postpartum, percentages of women consuming low amounts of milk consumption are of concern. Milk consumption among NATFAN women participants was higher than the total dairy consumption noted for African-American and Hispanic women WIC participants by Kong and associates [8] before the food package changes, but the percentage of women who drank at least 2 cups per day dropped from 63.9% before the food package changes to 61.2% after the changes.

The most noticeable change in milk consumption among women was the type of milk consumed. The percentage of women drinking whole milk after the changes (17.0%) was about half of that before the changes (34.3%). Higher percentages of women are drinking 2% and 1% fat cow's milk following the changes, with little difference in the percentages of women who drink ½% fat or skim milk.

Children

Milk provides important nutritional benefits, but whole milk can also be a significant source of fat in the diet. Excessive consumption of milk results in a significant increase in the total energy intake [11,18] and might be associated with inadequate consumption of other foods. Many NATFAN children drank more milk than the recommended amounts both before and after the WIC food package changes. High percentages of children were reported to be drinking four or more cups of milk per day, both before and after the changes. This amount is in excess of WIC recommendations for two-year-olds and Dietary Guidelines for Americans for two through four year old children. Since WIC provides about 2 cups of milk per day for children and the food package provides specific types of milk fat content for certain age groups, our results raise questions about the sources of milk reported for NATFAN children. For example, whole milk consumption was reported for two-through four-year-olds, and 2% and lower fat milk consumption for one- year-olds were reported after the food package changes, but these types of milk are not included in the food benefit for these child age groups. The separate NATFAN surveys for women and children do not allow for comparison of milk consumption by women and children within the same family, but the women in our surveys would not have consumed all of the milk provided by WIC. The NATFAN results for women and children, taken together, point to the reasonable likelihood that milk may be shared by family members. Although our findings also raise the possibility that caregivers may have overestimated consumption (for example, Huh and associates[19] reported a mean daily consumption of 2.6 servings of milk per day for two-year-olds), the reported consumption amounts for children were similar for the two large NATFAN cross-sectional surveys.

Over 90% of children drank cow's milk both before and after the 2009 food package change. Consumption of cow's milk according to fat content was significantly different following the changes in the WIC food package for children in both age groups. For 1-year-olds, the percentage reported to be drinking whole milk was higher for the NATFAN survey following the changes, with a corresponding decrease in the percentage reported to be drinking 2% milk. Consumption of low fat and skim milk was minimal before and after the changes for this age group. These findings reflect a higher proportion of NATFAN 1-year-olds drinking whole milk, and much lower percentages drinking reduced or fat-free milk, compared to the 12 to 23-month-olds (both WIC and non-WIC enrolled) represented in the 2008 Feeding Infants and Toddlers study [20]. Since WIC provided only whole milk for 1-year-olds in both the old and new food packages, the percentage increase in whole milk consumption is assumed to be associated with factors other than the WIC food benefit.

The reported change in consumption of milk according to fat content following the WIC changes for children aged two through four was similar to that seen for adults, with a much smaller proportion of children consuming whole milk and increased percentages consuming 2% milk and 1% milk after the food package changes. There was little difference after the WIC food package

changes in the percentages of two-to four-year-old children reported to be drinking ½% fat or skim milk, which all remained at less than five percent, but the proportions of these children (3.8% – 4.7%) drinking skim milk were greater than that reported for one-year-olds (.6% - .4%).

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Grain Consumption by NATFAN Participants Before and After WIC Food Package Revisions

How often do WIC participants choose whole grain products?

Abstract

This report describes grain product consumption reported in the National Food and Nutrition (NATFAN) Surveys carried out in 49 State and Territorial WIC Programs before and after changes in the WIC food benefit. Participants were 17,583 women and 38,765 children aged one through four, who had received WIC foods in the past 30 days. Women attending WIC clinics during the survey periods responded to questions about their own (Women questionnaire) or their child's (Child questionnaire) dietary practices, including the frequency and type of refined or whole grain foods consumed. Demographic characteristics for the study participants before and after the changes were similar for both the Women and the Child questionnaire respondents. Results indicated higher percentages of women and children were consuming 100% whole wheat bread, whole wheat tortillas and brown rice once a week or more after the food package changes. Slightly lower percentages were consuming white bread, white rice and flour tortillas once a week or more after the food package changes. Among the whole grain foods considered in the NATFAN surveys, the highest number and largest percentages of participants reported that they were consuming 100% whole wheat bread one or more times a week after the food package changes.

Summary

What is the issue?

With growing evidence of the health benefits of whole grains over refined grains, one of the major changes to the WIC food packages in 2009 was the addition of whole grains for breastfeeding women and for children. WIC children now receive two pounds of whole wheat bread or a whole grain option. Women who are pregnant, partially breastfeeding, or fully breastfeeding receive one pound of whole wheat bread or other whole grain option. This report addresses whether the frequency of consuming whole grain foods was greater and the consumption of refined grains less frequent, following the inclusion of whole grain products in the food package for WIC women and children.

What did the study find?

Consumption frequencies for grain products by children were similar to those of women both before and after the WIC food package changes.

Higher percentages of women and children were consuming 100% whole wheat bread, whole wheat tortillas and brown rice once a week or more after the food package changes. Slightly lower percentages were consuming white bread, white rice and flour tortillas once a week or more after the food package changes.

The greatest change in frequency of consumption was noticed for 100% whole wheat bread than any other whole grain product. Higher percentages of women and children were consuming 100% whole wheat bread after the food package changes. Of the NATFAN children and women who were consuming grain products, more than 85% were consuming 100% whole wheat bread once a week or more after the food package changes.

How was the study conducted?

The NATFAN study was conducted with WIC participants in 49 State and Indian Tribal Organization WIC Programs before and after the revision of the food package in 2009. This report uses results from NATFAN surveys of women and children, to examine the impact of the food package change on the frequency of consumption of refined and whole grains. To produce this report, we used completed NATFAN surveys representing women and children with reported ages of one through four years who had received WIC foods in the past thirty days. We provide summary tables for a total of 17,583 women and 38,765 children for the relevant items for grain consumption.

Introduction

Consuming whole grains as a part of a healthy diet can reduce the risk of cancer and coronary heart disease, may help with weight maintenance, and may lower risk for other chronic diseases such as diabetes. [1,2] There is growing evidence linking whole grain consumption with weight reduction, and refined grain consumption with many adverse conditions including heart diseases.[3] Studies have shown that whole grain consumption might contribute to weight loss through a greater feeling of satiation and by lower glycemic response and insulin demand.[2,3] Despite increasing evidence that eating more whole grains may reduce the risk of heart diseases and the likelihood of becoming overweight, Americans eat too much food made with refined grains and not enough of whole grains.[4] Data collected from the USDA Continuing Survey of Food Intakes by Individuals (CSFII) conducted in 1994-96 and 1998 showed that 93% of Americans failed to meet the recommendation to consume 3 ounces per day of whole grains for a 2,000-calorie diet.[4]Among WIC participants, whole grain consumption may differ by race and acculturation, with Hispanic mothers and children consuming more whole grains than African Americans and more acculturated Hispanic reporting smaller amounts of whole grains.[6] In California, the proportion of respondents who reported eating whole-grain food increased significantly after the change to the new food package; consumption of whole-grain food increased by 17.3 percentage points, a 51% increase over baseline.[9]

Whole Grain Recommendations

The Dietary Guidelines for Americans (DGAs)[5] recommend that people of all ages should consume at least half of the recommended grain servings as whole grains. Most Americans do not meet the DGA recommendations[6] and to help reverse this trend, one of the major revisions to the WIC food packages was the addition of whole grains.

Revisions to the WIC food package

Whole grain products including bread, rice, oatmeal, and whole wheat and/or corn tortillas were introduced to WIC participants a result of the 2009 WIC food package revisions. Prior to the changes, grains were included only in the form of breakfast cereal, and WIC regulations did not specify minimum whole-grain content.[8] White bread, white tortillas and white rice were not a part of the WIC food package before or after the changes.

In the new food packages, at least half of the total numbers of breakfast cereals on State agency food list must have whole grain as the primary ingredient [7] WIC children now receive two pounds of whole wheat bread or whole grain option. Postpartum women who are not breastfeeding do not receive any whole grain foods.[7] Women who are pregnant, partially breastfeeding, or fully breastfeeding receive one pound of whole wheat bread or other whole grain option. Specific federally authorized whole grains (brown rice, bulgur, barley, oatmeal, and soft corn or whole-wheat tortillas) are allowed as alternatives to 100% whole wheat bread. State

Agencies (SAs) are provided the flexibility to allow substitutions. As of 2011, 90% of SAs allowed brown rice to be substituted for 100% whole wheat bread and 82 percent allowed soft corn or whole-wheat tortillas, while only 39% allowed oatmeal to be substituted for whole wheat bread. [8]

Methods

Participants and inclusion criteria

The study population included women and caregivers of children who attended WIC clinics in 49 State and Indian Territorial Organization WIC programs that participated in the NATFAN study before and after the food package changes. For this study, we included responses from the Women's questionnaire and the Children's questionnaires in which the respondent indicated that they (or the child) had received WIC foods in the past 30 days, provided complete demographic information and completed all of the relevant questionnaire items for the grain products. We did not include responses from postpartum non-breastfeeding women in the analyses, because they do not receive whole grain products in the WIC food package. The resulting data set consisted of 17,583 women and 38,765 children one through four years of age.

Definitions: questionnaire items used

Grain product frequency of consumption. To determine the numbers and percentages of women and children from each survey wave (before and after the WIC food package revisions), who reported the frequency of daily grain product consumption, we used responses to the following questions: "*How many times do YOU* (women questionnaire) */does your child* (child questionnaire) *do the following: Eat corn tortillas, eat whole wheat tortillas, eat whole wheat or whole grain bread, eat brown rice, eat oatmeal, eat white bread, eat white flour tortillas or eat white rice. "* The answer choices were as follows: *never or less than once per week, 1 to 3 times per week, 4 to 6 times per week, 1 time per day, 2 times per day, 3 times per day*, and *4 or more times per day*. We consolidated and reported responses for the last three options using the category, "2 or more times per day."

Results

Women

Demographics

Table 1 provides characteristics for pregnant or breastfeeding women in the NATFAN study who responded to the questions relating to grain consumption. Among women who reported on consumption of grain products, the distributions of NATFAN participants according to age and breastfeeding status were the same for the surveys conducted before and after the food package changes. The distributions of participants according to other characteristics were significantly different: The proportion of women who were pregnant was lower for the survey following the changes (χ^2 [2, n = 17,583] = 25.35, $p<.00$). The proportion of Hispanic women was greater in the survey following the WIC food changes (χ^2 [3, n = 17,583] = 10.22, *p<.02).* Likewise, the distributions of women according to educational level were different (χ^2 [3, n = 17,583] = 16.02, *p<.00),* with a smaller proportion of women reporting less than high school and high school education, and more women with college level education following the changes. The distribution of reported language spoken at home included greater proportions who spoke Spanish or both Spanish and English, in the survey following the changes (χ^2 [3, n = 17,583] = 18.10, *p<.00).*

Table 1. Demographic Characteristics for Women NATFAN Participants Who Reported on Grain Consumption Before and After the Food Package Changes (n=17,583).

Demographic Characteristic	Before (n=7,924)		After (n=9,659)	
Mean age (*SD*)	25.6	(*6.20*)	25.7	(*6.56*)
	n	%	n	%
Race*				
White	3,042	38.4	3,645	37.7
Hispanic	3,083	38.9	3,937	40.8
Black	972	12.3	1,181	12.2
Others	827	10.4	896	9.3
Education**				
Less than high school	2,324	29.3	2,773	28.7
High school and GED	2,607	32.9	3,032	31.4
At least some college	2,505	31.6	3,128	32.4
College graduates	488	6.2	726	7.5
Language spoken at home				
English	5,203	65.7	6,109	63.2
Both Spanish and English	1,116	14.1	1,516	15.7
Spanish	1,458	18.4	1,890	19.6
Other	147	1.9	144	1.5
Pregnancy status**				
Pregnant	4,344	54.8	4,931	51.1
Breastfeeding	2,327	29.4	2,768	28.7

** "Race" and "Education" categories were consolidated from multiple response options.*
*** Separate questionnaire items; totals do not equal 100%*

Frequency of consumption of grain products by NATFAN women

We examined the numbers and percentages of women from each survey wave (before and after the WIC food package revisions), who reported frequency of grain product consumption.

Frequency of consumption of bread by NATFAN women

Table 2. Consumption Frequency of bread by Women in NATFAN Study Before and After the WIC Food Package Revisions (n=17,583)

Consumption Frequency	Before (n=7,924)		After (n=9,659)	
	n	%	n	%
Whole Wheat Bread				
Never or less than once/week	1,668	21	1,265	13.1
1 to 6 times per week	3,596	45.4	4,768	49.4
1 time per day	1,377	17.4	1,939	20.1
2 or more times per day	1,283	16.2	1,687	17.5
White Bread**				
Never or less than once/week	2,178	27.5	3,565	36.9
1 to 6 times per week	3,691	46.6	4,278	44.3
1 time per day	1,078	13.6	974	10.1
2 or more times per day	977	12.3	842	8.7

**Totals represent responses from participants who answered all grain questions*

***Not a WIC food before or after changes*

There was a clear shift toward more frequent consumption of whole wheat bread and less frequent consumption of white bread following the changes, with higher percentages of women consuming whole wheat bread once a day or more frequently, and lower percentages consuming white bread once a day or more often. Overall, the frequency of consumption of whole wheat bread more than once a week was higher than that for white bread.

Frequency of consumption of tortillas by NATFAN women

Table 3. Consumption Frequency of Tortillas by Women in NATFAN Study Before and After the WIC Food Package Revisions (n=17,583)

Consumption Frequency	Before (n=7,924)		After (n=9,659)	
	n	%	n	%
Whole Wheat Tortillas				
Never or less than once/week	5,752	72.6	6487	67.2
1 to 6 times per week	1,709	21.6	2485	25.7
1 time per day	255	3.2	431	4.5
2 or more times per day	208	2.6	256	2.7
White Tortillas*				
Never or less than once/week	3,916	49.4	4,951	51.3
1 to 6 times per week	3,256	41.1	3,914	40.5
1 time per day	395	5	442	4.6
2 or more times per day	357	4.5	352	3.6
Corn Tortillas				
Never or less than once/week	3,294	41.6	4,170	43.2
1 to 6 times per week	2,970	37.5	3,454	35.8
1 time per day	523	6.6	722	7.5
2 or more times per day	1,137	14.3	1313	13.6

**Totals represent responses from participants who answered all grain questions*

***Not a WIC food before or after changes*

Overall, about ¾ of NATFAN women reported infrequent (less than once a day) consumption of any of the three types of tortillas before and after changes in the WIC food package. After implementation of the changes, which included whole wheat and corn tortillas for pregnant and breastfeeding women, higher percentages of women were consuming whole wheat tortillas more often than once a week, while smaller percentages were consuming white tortillas or corn tortillas more than once a week. Of the three types of tortillas, corn tortillas were eaten most frequently and whole wheat tortillas least frequently, before and after the changes.

Frequency of consumption of rice by NATFAN women

Table 4. Consumption Frequency of Rice by Women in NATFAN Study Before and After the WIC Food Package Revisions (n=17,583)*

Consumption Frequency	Before (n=7,924)		After (n=9,659)	
	n	%	n	%
Brown Rice				
Never or less than once/week	5,250	66.3	6,090	63.1
1 to 6 times per week	2,158	27.2	2,945	30.5
1 time per day	305	3.8	420	4.3
2 or more times per day	211	2.7	204	2.1
White Rice **				
Never or less than once/week	2,357	29.7	3,121	32.3
1 to 6 times per week	4,371	55.2	5,301	54.9
1 time per day	621	7.8	677	7
2 or more times per day	575	7.3	560	5.8

* *Totals represent responses from participants who answered all grain questions*

***Not a WIC food before or after changes*

As seen in Table 4, brown rice was consumed infrequently before and after the food package changes, although the percentages of respondents who reported eating brown rice at least once a week were greater following the changes. White rice was consumed much more frequently, with over 70% of the respondents consuming white rice at least once a week.

Frequency of consumption of oatmeal by NATFAN women

As seen in Table 5, oatmeal consumption among women was infrequent both before and after the food package changes, and smaller percentages of women reported eating oatmeal at least once a week following the changes.

Table 5: Consumption Frequency of Oatmeal by Women in the NATFAN study before and after food package changes (n=17,583)*

Consumption Frequency	Before (n=7,924)		After (n=9,659)	
	n	%	n	%
Oatmeal				
Never or less than once/week	2,982	37.6	3,831	39.7
1 to 6 times per week	3,780	47.7	4,517	46.8
1 time per day	805	10.2	928	9.6
2 or more times per day	357	4.5	383	4

**Totals represent responses from participants who answered all grain questions*

Children

Demographics. Table 6 provides characteristics for one to five year old children and their caregivers in the NATFAN study who responded to the questions relating to grain consumption.,

Table 6. Demographic Characteristics for Children NATFAN Participants With Reported Grain Consumption Before and after the Food Package Changes (n=38,765).

Demographic Characteristic	Before (n =19,287)		After (n =19,478)	
Children				
Age in Months				
M (*SD*)	31.1 (*13.33*)		31.6 (*13.33*)	
	n	%	n	%
Sex				
Boy	9,984	51.8	10,011	51.4
Girl	9,303	48.2	9,467	48.6
Caregivers				
Mean age (*SD*)	28.0 (*7.63*)		28.4 (*7.53*)	
Race*				
White	9,172	47.6	8,926	45.8
Hispanic	5,242	27.2	5,793	29.7
Black	2,638	13.7	2,844	14.6
Others	2,235	11.6	1,915	9.8
Education*				
Less than high school	4,101	21.3	3,957	20.3
High school and GED	6,683	34.7	6,513	33.4
At least some college	6,997	36.3	7,356	37.8
College graduates	1,506	7.8	1,652	8.5
Language spoken at home				
English	14,617	75.8	14,286	73.3
Both Spanish and English	2,468	12.8	2,813	14.4
Spanish	1,917	9.9	2,066	10.6
Other	285	1.5	313	1.6

** "Race" and "Education" categories were consolidated from multiple response options*

Gender distribution of children was not different for the surveys conducted before and after the WIC food changes. The mean age for NATFAN children was higher for children represented in the survey following the changes and was statistically significant ($F[1, 38,765] = 13.32$, $p<.00$),

but the difference of .5 months does not appear to have practical significance for consumption of grains. There were also statistically significant differences in caregiver characteristics for the two surveys. As was the case for child's age, the mean age for caregivers was higher in the survey following the WIC changes (F [1, 38,765] = 38.92, $p<.00$), but this difference does not appear to be meaningful for purposes of this report. Again following the demographic pattern for NATFAN women, there were significant differences in the distributions of caregiver race/ethnicity, level of education, and language spoken at home for respondents in the two surveys. The proportions of Hispanic and Black caregivers were greater and the proportion of White caregivers smaller in the survey following the WIC food changes (χ^2 [3, n = 38,765] = 62.33, $p<.02$). Likewise, the distributions of caregivers according to educational level were different (χ^2 [3, n = 38,765] = 19.55, $p<.00$), with a smaller proportion of caregivers reporting less than high school and high school education, and more caregivers with college level education represented in the survey following the changes. The distribution of reported language spoken at home included fewer caregivers who reported English, and greater proportions who spoke Spanish or both Spanish and English at home, in the survey following the changes (χ^2 [3, n = 38,765] = 32.27, $p<.00$).

Frequency of consumption of grain products by NATFAN children

Frequency of consumption of bread by NATFAN children

Table 7: Frequency of bread consumption by children in the NATFAN study before and after implementation of the revised WIC food package.

Consumption Frequency	Before (n=19,287)		After (n=19,478)	
	n	%	n	%
Whole Wheat Bread				
Never or less than once/week	4,725	24.5	2,799	14.4
1 to 6 times per week	9,309	48.3	10,070	51.7
1 time per day	3,016	15.6	3,863	19.8
2 or more times per day	2,237	11.6	2,746	14.1
White Bread**				
Never or less than once/week	5,410	28	7,481	38.4
1 to 6 times per week	9,665	50.1	8,801	45.2
1 time per day	2,453	12.7	1,903	9.8
2 or more times per day	1,759	9.1	1,293	6.6

* *Totals represent responses from participants who answered all grain questions*

***Not a WIC food before or after changes*

For children, the NATFAN results show a clear shift towards increased frequency of consumption of whole wheat bread and decreased consumption of white bread. After implementation of the revised food package, higher percentages of children were consuming whole wheat bread more than once a week (75.5% Before and 85.6% After), while smaller percentages were consuming white bread (72% Before and 61.6% After) more than once a week. Overall, the frequency of consumption of whole wheat bread more than once a week was greater than that for white bread before and after the changes.

Frequency of consumption of tortillas by NATFAN children

Table 8. Frequency Of Tortilla Consumption By Children In The NATFAN Study Before And After The Food Package Changes(n=38,765)*

Consumption Frequency	Before (n=19,287)		After (n=19,478)	
	n	%	n	%
Whole Wheat Tortillas				
Never or less than once/week	15,093	78.3	13,758	70.6
1 to 6 times per week	3,532	18.3	4,870	25
1 time per day	435	2.3	570	2.9
2 or more times per day	227	1.2	280	1.4
White Tortillas**				
Never or less than once/week	10,980	56.9	11,635	59.7
1 to 6 times per week	7,228	37.5	6,859	35.2
1 time per day	669	3.5	593	3.0
2 or more times per day	410	2.1	391	2.0
Corn Tortillas				
Never or less than once/week	9,987	51.8	10,443	53.6
1 to 6 times per week	7,061	36.6	6,871	35.3
1 time per day	1,161	6.0	1,159	6.0
2 or more times per day	1,078	5.6	1,005	5.2

**Totals represent responses from participants who answered all grain questions*

***Not a WIC food before or after changes*

After implementation of the revised food package, higher percentages of children were consuming whole wheat tortillas more than once a week, while smaller percentages were consuming white tortillas and corn tortillas more than once a week. Of the three types of tortillas, corn tortillas were eaten most frequently, followed by white tortillas and wheat tortillas were consumed least frequently by children, both before and after the food package changes. These results were very similar to the consumption frequencies for NATFAN women but children consumed corn tortillas less often than adults.

Frequency of consumption of rice by NATFAN children

Table 9: Frequency Of Rice Consumption By Children In The NATFAN Study Before And After The Food Package Changes(n=38,765)*

Consumption Frequency		Before (n=19,287)		After (n=19,478)	
		n	%	n	%
Brown Rice					
	Never or less than once/week	12,962	67.2	11,979	61.5
	1 to 6 times per week	5,432	28.2	6,447	33.1
	1 time per day	576	3	675	3.5
	2 or more times per day	317	1.6	377	1.9
White Rice**					
	Never or less than once/week	6,104	31.6	6,790	34.9
	1 to 6 times per week	11,003	57.0	10,527	54.0
	1 time per day	1,150	6.0	1,154	5.9
	2 or more times per day	1,030	5.3	1,007	5.2

** Totals represent responses from participants who answered all grain questions*

***Not a WIC food before or after changes*

As seen in Table 9, the percentages of children eating brown rice more than once a week were higher after the food package changes but brown rice was consumed infrequently before and after the changes. While only about 35% of children ate brown rice, over 65% ate white rice at least once week, both before and after the food package changes.

Frequency of consumption of oatmeal by NATFAN children

Table 10: Frequency Of Oatmeal Consumption By Children In The NATFAN Study Before And After The Food Package Changes(n=38,765)*

Consumption Frequency	Before (n=19,287)		After (n=19,478)	
	n	%	n	%
Oatmeal				
Never or less than once/week	6,154	31.9	6,817	35.0
1 to 6 times per week	10,454	54.2	10,114	51.9
1 time per day	2,052	10.6	1,937	9.9
2 or more times per day	627	3.3	610	3.1

**Totals represent responses from participants who answered all grain questions*

Similar to the consumption reported for women, lower percentages of children were consuming oatmeal once a week or more after the food package changes.

Discussion

In 2009, for the first time in the history of the WIC food packages, whole grain products were included for children, pregnant, partially or fully breast feeding women participants. The new package now provides two pounds of 100% whole-grain bread for children and one pound for pregnant or breastfeeding women. State agencies were given the flexibility to substitute the 100% whole wheat bread with other federally approved whole grains products such as brown rice, oats, and soft wheat and corn tortillas.

The NATFAN surveys provide important information about consumption of whole and refined grain products by women and children who received WIC foods. The surveys collected information on the frequency of consumption of five whole grain products (whole wheat bread, whole wheat tortillas, corn tortillas, brown rice and oatmeal) provided in the new package and three refined grain products (white bread, white tortillas and white rice) which were not provided by WIC either before or after the food package changes.

There are some limitations associated with the findings in this report. First, the NATFAN surveys did not collect information about consumption of breakfast cereals or the amounts of whole grain foods consumed. Surveys were administered at different times of the year, so it is possible that seasonal variation may have affected consumption, particularly for oatmeal which is most often prepared as a hot cereal. Although NATFAN collected information for consumption frequencies of individual whole grain and refined products, the questionnaires do not allow the determination of overall consumption of whole grain and refined grain products.

As a result, it is not possible to determine whether NATFAN women and children were consuming the recommended amounts of whole grains.

Limitations notwithstanding, higher percentages of women and children were consuming 100% whole wheat bread, whole wheat tortillas and brown rice once a week or more after the food package changes. Slightly lower percentages were consuming white bread, white rice and flour tortillas once a week or more after the food package changes. Consumption frequencies for corn tortillas and oatmeal once a week or more, did not change much after the food package changes and was in fact slightly lower.

One important factor influencing these results could be the fact that 100% whole wheat bread was the default option grain provided to most participants. According to the USDA's Options Study, [8] SAs were allowed to substitute other products for whole wheat bread. About 90 percent of SAs allowed brown rice to be substituted for 100% whole wheat bread, and 82 percent allowed soft corn or whole-wheat tortillas, whereas only 39% of State Agencies authorized substitution with oatmeal. We do not have information about what percentages of NATFAN respondents actually used the WIC option to substitute brown rice, whole wheat or corn tortillas or oatmeal for 100% whole wheat bread, so variations in consumption of the brown rice and corn or whole wheat tortillas may or may not have been associated with the WIC food package.

Our results show that the consumption frequencies for women and children were very similar, although the women and children represented in the NATFAN surveys were not from the same households. The greatest change in frequency of consumption of the WIC-approved whole grain foods was for 100% whole wheat bread. Of the NATFAN children and women who were consuming grain products, more than 85% were consuming 100% whole wheat bread once a week or more after the food package changes.

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Fruit and Vegetable Consumption by NATFAN Participants Before and After WIC Food Package Revisions

Does the introduction of vouchers for fruits and vegetables change the quantity consumed or the variety consumed by women and children?

Abstract

This report describes fruit and vegetable consumption for women and children who participated in the National Food and Nutrition Surveys (NATFAN) carried out in 49 State and Territorial WIC Programs before and after revisions in the WIC food benefit. Participants were 24,812 women and 42,141 children aged one through four who had received WIC foods in the past 30 days. Women attending WIC clinics during the survey periods responded to questions about their own (Women questionnaire) or their child's (Child questionnaire) dietary practices, including the frequency of consumption and kinds of fruits and vegetables consumed. Demographic characteristics for the study participants before and after the revisions were similar for both the Women and the Child questionnaire respondents. Smaller percentages of women and children ate fruit and vegetables once a day or less, and higher proportions ate fruit and vegetables at least twice a day, after the food package changes. These shifts suggested a trend towards increased consumption of fruits and vegetables after implementation of the revised WIC food package, but even after the changes about 40% of the NATFAN women were consuming fruit and vegetables less than once a day. The variety of fruits and vegetables consumed did not change significantly after the food package changes.

Summary

What is the Issue?

Most Americans consume less than the recommended amount of fruit and vegetables with low-income households consuming even less than others household. In 2009, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) food package was revised to include $10.00 cash value of fruit and vegetable benefits for WIC eligible adult participants and $6.00 for child participants. The issue of concern is whether the addition of fruits and vegetables to the food benefit was associated with greater consumption among women and children.

What Did This Study Find?

After the food package changes higher percentages of women and children were eating fruits and vegetables more than once a day and smaller percentages were consuming them less than once a day. This indicates a shift towards increased consumption of fruits and vegetables after the food package changes. Higher percentages of NATFAN children were consuming fruits and vegetables one or more times per day than the NATFAN women participants. The majority of women and children were eating fruits and vegetables at frequencies that would not meet the recommended daily amounts. The variety of fruits and vegetables consumed did not change much after the food package revisions.

How Was This Study Conducted?

The National Food and Nutrition (NATFAN) study surveyed WIC participants in 49 State and Indian Tribal Organization WIC Programs before and after implementation of the revised WIC food packages in 2009. Results from NATFAN surveys of women and children were analyzed to assess the impact of the food package revisions on the frequency of consumption and the variety of fruits and vegetables consumed by women and children. Completed NATFAN surveys representing women and children (aged one through four years) receiving WIC foods in the past thirty days and answering relevant demographic and fruit and vegetable NATFAN questions were analyzed. We produced descriptive statistics and summary tables representing 24,812 women and 42,141 children for whom fruits and vegetable consumption frequency, variety and most frequently consumed fruits and vegetables before and after implementation of the revised WIC food packages. Since the dietary recommendations differ for one-year-old children and children aged two and older, we provide information separately for children in these two age groups.

Introduction

Dietary recommendations for fruit and vegetables

Consumption of fruit and vegetables is essential to developing and maintaining good health and optimal weight for adults and children. The *Healthy People 2010* objectives included increasing the proportion of people aged two and older who consume two or more servings of fruit daily to 75%, and increasing the proportion of people who consume 3 or more servings of vegetables daily to 50% [1]. However, most Americans consume much less than the recommended amounts of fruits and vegetables. A 2009 analysis from the Behavioral Risk Factor Surveillance System (BRFSS) estimated only 32.5% of adults ate fruit two or more times per day and only 26.3% ate vegetables three or more times per day [2] which was far below the national recommendations. The Institute of Medicine reported similar trends in below average fruit and vegetable consumption for WIC participants and recommended including fruits and vegetables in the WIC food packages[3].

Due to ongoing low consumption of fruit and vegetables reported in the *Healthy People 2010* Final Report[1], the *Healthy People 2020* nutrition objectives for fruit and vegetable consumption were modified to acknowledge the low baseline of consumption and to establish potentially achievable shifts toward consumption in alignment with the 2010 *Dietary Guidelines for Americans*[4]. The new dietary guidelines were being added at about the same time the implementation of the revised WIC food packages was taking place.

The daily dietary recommendations for women in the age group served by WIC are 2 cups of fruits and 2 ½ cups of vegetables, for a one year old child it is 1 cup each of fruits and vegetables /day and 1-1 ½ cups each of fruits and vegetables/day for children aged two through four years. Based on MyPlate[5] recommendations that are consistent with *2010 Dietary Guidelines for Americans*, WIC recommends that half of each meal plate consist of fruits and vegetables.

Revisions to the WIC food packages: Fruit and vegetable vouchers for women and children

The old WIC food packages provided no fruits or vegetables except the option of dried peas and beans and carrots for fully breastfeeding women. As of October 1, 2009, WIC eligible adult participants were provided $10.00 and children $6.00 worth of fruits and vegetables monthly[6].

These fiber rich, nutrient dense and low fat fruits and vegetables are now provided to WIC participants to partially or fully replace juice in the food package and to allow for healthier food options that may contribute to improving dietary choices.[7].

The objective of this report is to determine whether the introduction of vouchers for fruits and vegetables changed the frequency of consumption and variety consumed by women and children who participated in the National Food and Nutrition Questionnaire (NATFAN), a repeated cross-sectional survey of WIC participants that was administered before and after revisions to the WIC food package. This report provides participant demographic characteristics, descriptive statistics and summary tables to determine whether the addition of fruits and vegetables was associated with changes in consumption. The variety and frequency of fruit and vegetable consumption was assessed before and after the new food package implementation; since the dietary recommendations differ for one-year-old children and children aged two and older, assessment for children in these two age groups was done separately.

The NATFAN study collected information about the consumption frequency and not the amounts of fruits and vegetables consumed. To obtain a rough estimation of amounts, we assumed that a child (one through four years of age) would consume 1 serving or ½ cup of fruit or vegetable at a time and that an adult would consume 1 serving or 1 cup at a time. Using this rationale, women would need to eat fruit two or more times/day and vegetables three or more times/day, and children would need to eat fruits and vegetables two or more times/day to meet the recommended amounts.

Methods

To produce this report, completed NATFAN surveys representing the study populations of women (N=24,812) and children aged one through four years (N=42,141) who reported receiving WIC foods in the past thirty days were selected. Descriptive analyses were conducted to examine the kind, variety and consumption frequency of fruits and vegetables consumed by women and children before and after implementation of the revised WIC food packages.

Fruit Consumption

The percentage of women and children who consume fruit in the NATFAN study before (Survey 1) and after (Survey 2) implementation of the WIC food package revisions was determined by asking, "*How often do you do the following?: eat fruit*", where the answer choices were as follows: *never or less than once per week, 1 to 3 times per week, 4 to 6 times per week, 1 time per day, 2 times per day, 3 times per day*, and *4 or more times per day*. The variety of fruit consumed by women in the NATFAN study was determined by analyzing responses to the question, "*During the past year, which fruits did you usually eat*?" with multiple answers options such as apples, berries, mango, and watermelon.

Vegetable Consumption

The percentages of women and children who consumed vegetables in the NATFAN study both before (Survey 1) and after (Survey 2) implementation of the revised WIC food packages, was determined by asking "*How often do you do the following?: eat vegetables such as salad, carrots, or sweet potatoes; This does not include potatoes, French fries or potato chips.*", where the answer choices were as follows: *never or less than once per week, 1 to 3 times per week, 4 to 6 times per week, 1 time per day, 2 times per day, 3 times per day*, and *4 or more times per day*.

The variety of vegetables consumed by women and children in the NATFAN study before and after implementation of the revised WIC packages was determine by analyzing responses to the question, "*During the past year, which vegetables did you usually eat*?" with multiple answers options such as broccoli, green beans, sweet potatoes, and tomatoes.

Results

Women Participant Demographics

To examine fruit and vegetable consumption in more detail, we used responses for women from state and Indian Tribal Organization WIC programs who participated in the two NATFAN surveys conducted before and after the food package revisions. For this report, we selected responses representing women who answered all of the questionnaire items relating to fruit and vegetable consumption, provided complete demographic information, and received WIC foods in the past 30 days. Table 1 provides characteristics for these women.

Table 1. Demographic Characteristics for Women NATFAN Participants Who Reported on Fruit and Vegetable Consumption (n=24,812).*

Demographic Characteristic	Before		After	
Age Mean (*SD*)	25.3	(*6.21*)	25.4	(*6.52*)
	n	(%)	n	(%)
Race**				
White	4,441	(39.1)	5,267	(39.1)
Hispanic	4,181	(36.8)	5,124	(38.1)
Black	1,569	(13.8)	1,847	(13.7)
Others	1,161	(10.2)	1,222	(9.1)
Totals	11,352	(100)	13,460	(100)
Education**				
Less than high school	3,395	(29.9)	3,880	(28.8)
High school and GED	3,843	(33.9)	4,418	(32.8)
At least some college	3,512	(30.9)	4,293	(31.9)
College graduates	602	(5.3)	869	(6.5)
Totals	11,352	(100)	13,460	(100)
Language spoken at home				
English	7,741	(68.2)	8,932	(66.4)
Both Spanish and English	1,504	(13.2)	1,970	(14.6)
Spanish	1,917	(16.9)	2,379	(17.7)
Other	190	(1.7)	179	(1.3)
Totals	11,352	(100)	13,460	(100)
Pregnancy status***				
Pregnant	4,585	(40.4)	5,271	(39.2)
6 months or less postpartum	5,040	(44.4)	5,711	(42.4)
Breastfeeding	2,424	(21.4)	2,907	(21.6)

* *Missing responses are not included in the table.*

*** "Race" and "Education" categories were consolidated from multiple response options*

**** Separate questionnaire items; totals do not equal 100% because women may have answered "yes" to more than one of these items.*

The distributions of age, women who were currently pregnant, and women who were currently breastfeeding were similar for NATFAN women who reported on fruit and vegetable consumption before and after the food package revisions. The distributions of race/ethnicity,

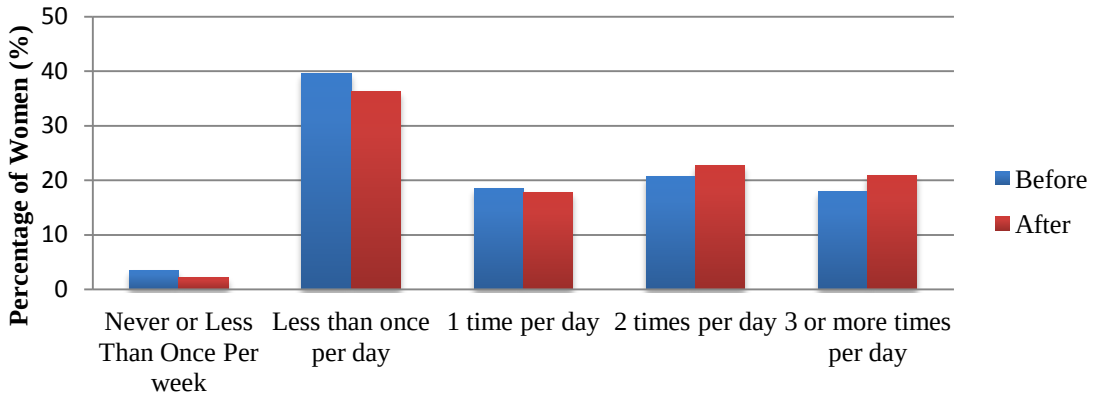
educational level, language spoken at home, and women who were 6 months or less postpartum were statistically significantly different for the post- food package change NATFAN survey, but we believe that these differences are associated with the large sample size rather than their possible association with the reported fruit and vegetable consumption in this report.

Fruit Consumption of Women in NATFAN Study

Frequency of fruit consumption

Figure 1 shows the frequency of fruit consumption by women in the NATFAN study before and after implementation of the revised WIC food package. After implementation of the revised food package, smaller percentages of women ate fruit once a day or less, and higher percentages of women reported they ate fruit twice a day or more. Even though there is a shift towards increased frequency of consumption after the food package changes, almost half of the NATFAN women respondents were consuming fruit less than once a day even after the changes.

Figure 1. Frequency of Fruit Consumption by Women in NATFAN Study Before and After Implementation of WIC Food Package Revisions (n=24,812)



Variety of fruit consumption

Of the 28 options of fruits provided on the NATFAN questionnaire, women had consumed an average of 11 specific types of fruit during the past year. As shown in Table 2, the top five most frequently consumed fruits did not change following the WIC food package revisions, and there was a slight increase in variety of fruits consumed.

Table 2. Most Frequently Consumed Fruits and Variety of Fruit Consumption for Women in NATFAN Study Before and After Implementation of WIC Food Package Revisions

Before			After		
	n	(%)		n	(%)
1. Bananas	10,217	(90.0)	1. Apples	12,008	(89.2)
2. Apples	10,203	(89.9)	2. Bananas	11,948	(88.8)
3. Grapes	9,828	(86.6)	3. Grapes	11,727	(87.1)
4. Strawberries	9,359	(82.4)	4. Strawberries	11,456	(85.1)
5. Oranges	9,240	(81.4)	5. Oranges	11,026	(81.9)

Consumption Variety of Fruits

	Before			After		
Variety of Fruits	Range	Mean	SD	Range	Mean	SD
	28	11.23	4.77	28	11.42	4.67

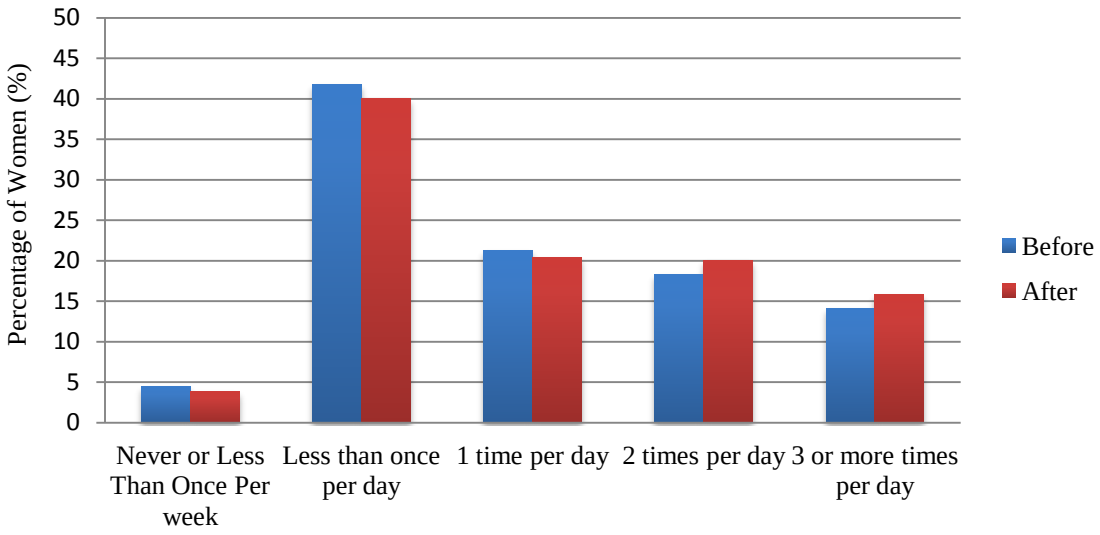
Vegetable Consumption by Women in the NATFAN Study

Frequency of vegetable consumption

Figure 2 shows the frequency of vegetable consumption by women in the NATFAN study. Smaller percentages of women were eating vegetables once a day or less after implementation of the revised food package. Although higher percentages of women consumed vegetables two or more times a day following the changes, fewer than 20% of women eat vegetables at the recommended levels of 3 or more times per day both before and after implementation of the

revised WIC food package.

Figure 2. Frequency of Vegetable Consumption by Women in NATFAN Study Before and After Implementation of WIC Food Package Revisions (n=24,812)



Variety of vegetable consumption

Of the 28 varieties provided as answer options on the NATFAN questionnaire, women consumed an average of about 12 types of vegetables during the past year. As shown in Table 3, the most-consumed vegetables by NATFAN women particpants were corn, potatoes, lettuce, carrots, and broccoli before and after implementation or the revised WIC food packages. After the food package changes, there was a slight increase in the variety of vegetables consumed.

Table 3. The Five Most Frequently Consumed Vegetables by Women in NATFAN Study Before and After Implementation of the Revised WIC Food Packages.

	Before			After	
	n	(%)		n	(%)
1. Corn	10,125	(89.2)	1. Corn	11,912	(88.5)
2. Potato	10,054	(88.6)	2. Potato	11,824	(87.8)
3. Lettuce	9,361	(82.5)	3. Lettuce	11,502	(85.5)
4. Carrot	9,279	(81.7)	4. Carrot	10,906	(81.0)
5. Broccoli	9,043	(79.7)	5. Broccoli	10,791	(80.2)

Consumption Variety of Vegetables for Women Before and After Implementation of the Revised WIC Food Packages.

Variety of Vegetables	Before			After		
	Range	Mean	SD	Range	Mean	SD
	28	12.26	5.11	28	12.47	5.09

Child Participant and Caregiver Demographics

To examine fruit and vegetable consumption for children, we selected responses that included complete and consistent answers to all demographic and fruit and vegetable - related questions for children who had received WIC foods in the last 30 days. Demographic characteristics (Table 4) for the children represented in the "Before" and "After" surveys were not significantly different for gender distribution or for caregiver educational level for 1-year-olds. The distributions of the other child and caregiver characteristics were significantly different, but we do not believe that the differences are meaningful in terms of the children's fruit and vegetable consumption described in this report.

Table 4. Demographic Characteristics for Child NATFAN Participants with Reported Fruit and Vegetable Consumption Before and After the WIC Food Package Changes (n=12,937 for 1 year olds and n=29,204 for 2 through 4 year olds)*

	1 Year Olds				2 through 4 Year Olds			
	Before		After		Before		After	
Children								
Mean age in mo. (*SD*)	15.9	*(3.67)*	16.1	*(3.72)*	37.7	*(10.17)*	38.1	*(10.12)*
Sex	n	(%)	n	(%)	n	(%)	n	(%)
Boy	3,274	(51.5)	3,368	(51.2)	7,361	(51.5)	7,672	(51.5)
Girl	3,082	(48.5)	3,213	(48.8)	6,935	(48.5)	7,236	(48.5)
Total	6,356	(100)	6,581	(100)	14,296	(100)	14,908	(100)
Caregivers of children								
Mean age (*SD*)	25.7	(8.22)	26.3	(8.28)	28.0	(8.91)	28.4	(8.71)
Race**								
White	2,868	(45.1)	2,846	(43.2)	6,758	(47.3)	6,781	(45.5)
Hispanic	1,717	(27.0)	1,947	(29.6)	4,018	(28.1)	4,534	(30.4)
Black	1,001	(15.7)	1,106	(16.8)	1,889	(13.2)	2,176	(14.6)
Others	770	(12.1)	682	(10.4)	1,631	(11.4)	1,417	(9.5)
Total	6,356	(100)	6,581	(100)	14,296	(100)	14,908	(100)
Education**								
Less than high school	1,434	(22.6)	1,470	(22.3)	3,102	(21.7)	3,096	(20.8)
High school and GED	2,256	(35.5)	2,266	(34.4)	4,880	(34.1)	4,917	(33.0)
At least some college	2,226	(35.0)	2,342	(35.6)	5,174	(36.2)	5,644	(37.9)
College graduates	440	(6.9)	503	(7.6)	1,140	(8.0)	1,251	(8.4)
Total	6,356	(100)	6,581	(100)	14,296	(100)	14,908	(100)
Language spoken at home								
English	4,742	(74.6)	4,742	(72.1)	10,741	(75.1)	10,944	(73.4)
Both Spanish and English	841	(13.2)	983	(14.9)	1,804	(12.6)	2,069	(13.9)
Spanish	670	(10.5)	727	(11.0)	1,538	(10.8)	1,662	(11.1)
Other	103	(1.6)	129	(2.0)	213	(1.5)	233	(1.6)
Total	6,356	(100)	6,581	(100)	14,296	(100)	14,908	(100)

* *Missing responses are not included in the table.*

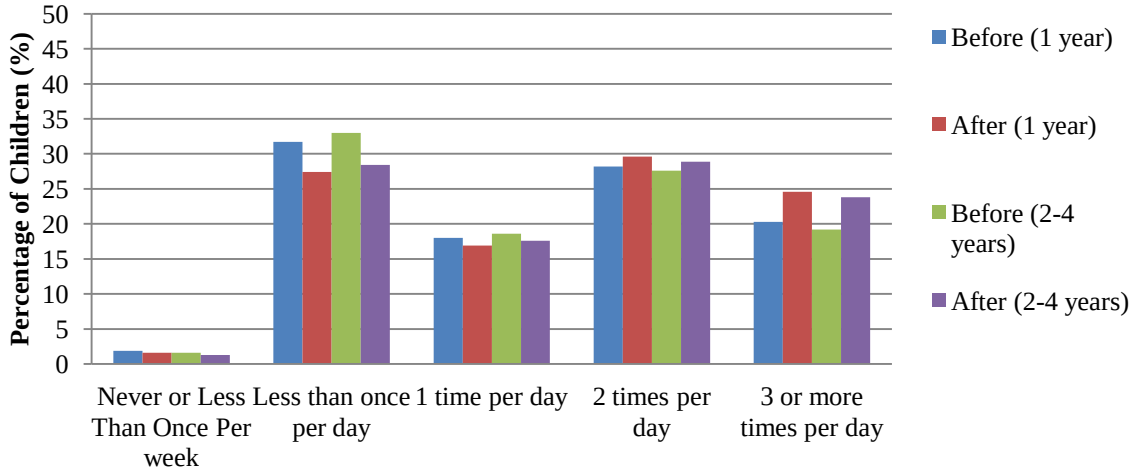
*** "Race" and "Education" categories consolidated from multiple response options*

Fruit Consumption of Children in NATFAN Study

Frequency of Fruit Consumption

NATFAN questions about children's fruit consumption were similar to those for adults, asking caregivers to respond on behalf of the child. As displayed in Figure 3, the percentage of children who ate fruit two or more times a day was greater after the introduction of fruit vouchers to the WIC food package. Fewer than 50% of children in both child age groups were eating fruit at least twice a day, both before and after implementation of the revised WIC food packages. The percentages of children (one year olds and two through four-year-olds) who ate fruit once a day or less were smaller following the food package changes.

Figure 3. Frequency of Fruit Consumption by 1 Year Old (n=12,937) and 2-4 Year Old (n=29,204) Children in NATFAN Study Before and After Implementation of Revised WIC Food Packages



Variety of Fruit consumption

Of the 28 varieties of fruit provided as answer options on the NATFAN questionnaire, caregivers reported that their one year old children consumed an average of about 10 types of fruit during the year before and after the WIC food package changes (Table 5**)**. Two through four-year-old children consumed about 11 types of fruit both before and after implementation of the revised WIC packages. As shown in Table 5, the most consumed fruits for all children particpating in the NATFAN study were bananas, apples, oranges, grapes, and strawberries before and after implementation or the revised WIC food package.

Table 5. Most Frequently Consumed and Variety of Fruit Consumption by Children in NATFAN Study Before and After Implementation of WIC Food Package Revisions

The Five Most Frequently Consumed Fruits by 1 Year Olds					
	Before			After	
	n	(%)		n	(%)
1. Banana	5,995	(94.3)	1. Banana	6,180	(93.9)
2. Apple	5,463	(86.0)	2. Apple	5,604	(85.2)
3. Orange	4,659	(73.3)	3. Strawberries	4,935	(75.0)
4. Grape	4,658	(73.3)	4. Grapes	4,927	(74.6)
5. Strawberries	4,360	(68.6)	5. Watermelon	4,750	(72.2)
The Five Most Frequently Consumed Fruits by 2-4 Year Olds					
1. Banana	13,595	(95.1)	1. Banana	14,161	(95.0)
2. Apple	13,472	(94.2)	2. Apple	13,989	(93.8)
3. Grape	12,493	(87.4)	3. Grape	13,165	(88.3)
4. Orange	12,095	(84.6)	4. Orange	12,513	(83.9)
5. Strawberries	11,236	(78.6)	5. Strawberries	12,298	(82.5)

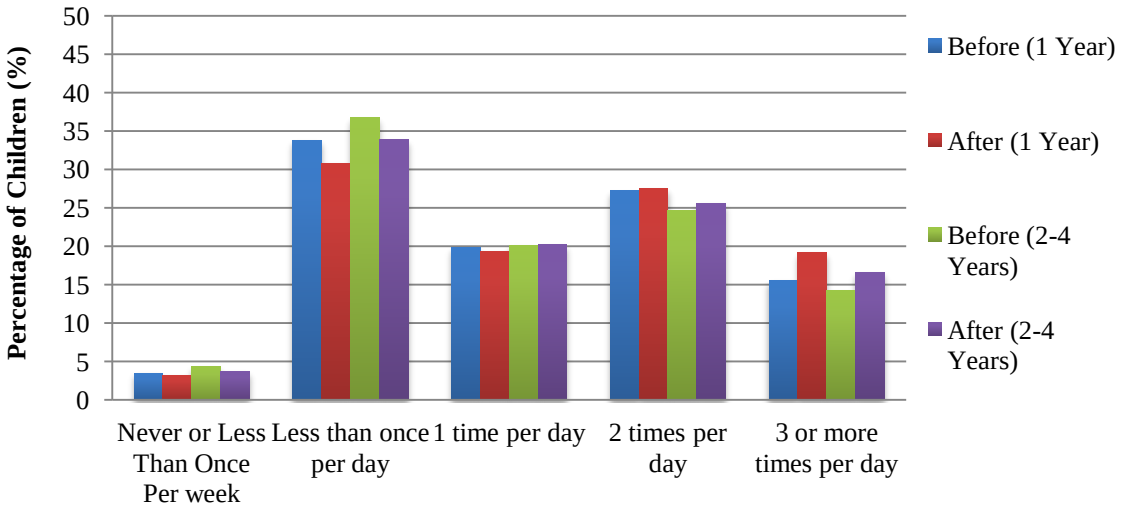
Consumption Variety of Fruits						
	Before			After		
Variety of fruits	Range	Mean	SD	Range	Mean	SD
1 year olds	28	9.69	4.53	28	9.81	4.50
2 -4 year olds	28	10.91	4.63	28	11.08	4.61

Vegetable Consumption of Children in NATFAN Study

Frequency of vegetable consumption

Figure 4 shows the frequency of vegetable consumption by children. Vegetable consumption frequency reported for both age groups of children was similar to that reported for adults before and after the food package changes, with a smaller percent reporting their children ate vegetables such as salad, carrots, or sweet potatoes less than once a day and greater percentages reporting more frequent consumption for the after implementation of revised WIC food packages.

Figure 4. Frequency of Vegetable Consumption by 1 Year Old (n=12,937) and 2-4 Year Old (n=29,204) Children in NATFAN Study Before and After Implementation of Revised WIC Food Packages.



Variety of vegetable consumption

Table 6. Most Frequently Consumed and Variety of Vegetable Consumption by Children in NATFAN Study Before and After Implementation of WIC Food Package Revisions

The Five Most Frequently Consumed Vegetables by 1 Year Olds					
	Before			After	
	n	(%)		n	(%)
1. Potato	5,553	(87.4)	1. Carrot	5,573	(84.7)
2. Carrot	5,517	(86.8)	2. Potato	5,532	(84.1)
3. Corn	4,953	(77.9)	3. Corn	5,139	(78.0)
4. Green bean	4,914	(77.3)	4. Green Beans	4,985	(75.7)
5. Broccoli	4,303	(67.7)	5. Broccoli	4,452	(67.6)
The Five Most Frequently Consumed Vegetables by 2-4 Year Olds					
1. Potato	12,377	(86.6)	1. Corn	12,986	(87.1)
2. Corn	12,353	(86.4)	2. Potato	12,697	(85.2)
3. Carrot	12,124	(84.8)	3. Carrot	12,395	(83.1)
4. Green Bean	10,561	(73.9)	4. Green Beans	10,878	(73.0)
5. Broccoli	10,222	(71.5)	5. Broccoli	10,699	(71.8)

Consumption Variety of Vegetables						
	Before			After		
Variety of Vegetables	Range	Mean	SD	Range	Mean	SD
1 year olds	28	9.67	4.68	28	9.57	4.67
2 -4 year olds	28	10.27	5.05	28	10.35	5.05

Of the 28 varieties of vegetables provided as answer options on the NATFAN questionnaire, caregivers reported that their one year old children consumed an average of approximately nine types of vegetables during the year both before and after implementaion of the revised WIC food package (Table 6). Two through four year old children consumed an average of about 10 types of vegetables both before and after implementaion of the revised WIC packages. As shown in Table 6, the top five most frequently consumed vegetables by both child age groups particpating in the NATFAN study were potatoes, carrots, corn, green beans, and broccoli before and after implementation or the revised WIC food packages.

Discussion

Fruit and vegetable consumption frequencies for both adults and children were higher after the changes in the WIC food package. Smaller percentages of participants were consuming both fruits and vegetables "never or less than once per week" or "once per day" and higher percentages were consuming fruits and vegetables more than "once per day" after the food package changes.

The percentage of women consuming fruit two or more times/day increased from 38.5% before to 43.6% after the implementation of the new food package. While the percentage of women consuming vegetables at frequencies (three or more times/day) needed to meet the daily recommendation was much lower than that of fruit consumption, it still increased from 14.1% before to 15.8% after the implementation. While the inclusion of fruits and vegetables in the food package seems to have changed the trend towards more frequent consumption, the NATFAN results indicate that many women and child participants continue to consume them at frequencies that would not equate to the recommended amounts of fruits and vegetables.

The percentage of children consuming fruit two or more times/day increased from 48.5% before to 54.2% after changes for one- year-olds, and from 46.8% to 52.7% for two-through four-year-olds after the implementation of the new food package. While the percentage of children consuming vegetables at the frequencies needed to meet the daily recommendation(two or more times/day) was a bit lower than the fruit consumption, consumption of vegetables at least twice a day increased from 42.7% before to 46.7% for one- year-olds and from 38.9% to 42.2% for two-through four-year-olds after the implementation.

In general, higher percentages of children were consuming fruits and vegetables one or more times per day than women participants. Fruit consumption by both women and children was at higher frequencies and closer to the recommended levels than vegetable consumption frequencies. The variety of fruits and vegetables consumed by NATFAN women and children did not seem to change much following the food package changes.

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Infant Baby Foods Consumption by NATFAN WIC Participants Before and After WIC Food Package Changes

Is the change in the infant food package associated with a change in the age of introduction of complementary foods? In addition, is the introduction of vouchers for specific types of baby food at six months of age associated with increased consumption of fruits and vegetables?

Abstract

This report describes the consumption of complementary baby foods and 100% juice reported in the National Food and Nutrition Surveys carried out in 49 State and Territorial WIC Programs before and after changes in the WIC food benefit. Caregivers attending WIC clinics during the survey periods responded to questions about their infants' diets, including the amount, kind, frequency and age of introduction of complementary foods. Responses represented 12,002 infants from birth through11 months of age who had received WIC foods in the past 30 days. Demographic characteristics for the study participants before and after the changes were similar. About 60% of all infants ate complementary foods such as cereal and commercially prepared baby foods. Infant cereal was consumed by almost all infants, and baby food meats were consumed least often. Results indicated an increase in the number of jars of baby food consumed by infants 6 through 11 months of age. There were corresponding decreases in the proportions of infants 6 through11 months of age who were introduced to baby food desserts, dinners and 100% juice, and a slight increase in the consumption of fruit and vegetable commercially prepared baby foods. Consumption of complementary foods by infants 4 months old and younger was reported by small percentages of caregivers before and after the food package changes and should continue to be addressed.

Summary

What is the issue?

Infant feeding practices associated with WIC participation have included relatively low rates of exclusive breastfeeding, high likelihood of formula feeding, and early introduction of complementary foods. Revisions to the WIC food benefits addressed these infant feeding practices to promote breastfeeding by modifying the formula amounts available to infants and increasing the age at which infants receive cereal and other complementary foods. Commercially prepared baby food fruits, vegetables and meats were added to the food benefits for infants 6 through 11 months of age, and 100% juice was eliminated, to encourage fruit and vegetable consumption and variety while limiting excess calories and carbohydrates. There is a need to determine whether the age of introduction and the consumption of baby foods, and 100% juice were different for infants receiving WIC foods following the food package changes.

What did the study find?

Overall, about 60% of the infants younger than 6 months of age were not fed prepared baby food before and after the changes, while almost all (over 97%) of older infants ate these foods. Infant cereal was the complementary food consumed by most infants, while baby food meats were least consumed by infants both before and after the revisions. Following the changes in the WIC food package for infants, smaller proportions of infants 6 through 11 months of age were introduced to baby food desserts, dinners and 100% juice, and the proportions of infants who consumed fruits and vegetables were higher. Following the WIC changes, the number of jars of baby foods consumed by infants 6 through 11 months of age was significantly higher. Consumption of complementary foods by infants 4 months old and younger was reported both before and after the changes, although the WIC food benefit did not and does not include complementary foods for these young infants.

How was the study conducted?

This report uses results from Infant NATFAN surveys to examine the impact of the food package changes on the age of introduction, frequency of consumption, kinds and amounts of complementary foods consumed by infants. The NATFAN study was conducted with WIC participants in 49 State and Indian Tribal Organization WIC Programs before and after revisions to the food packages in 2009. To produce this report, we used completed NATFAN questionnaires representing infants aged 0 through 11 months of age who had received WIC foods in the past 30 days. We provide summary tables and demographic information for responses representing 12,002 infants for whom complementary food consumption was reported by age of introduction and frequency. Since the dietary recommendations and WIC food packages are different for infants 0 through 5 months of age and infants 6 through 11 months of age, we report on infants in these two age groups separately.

Introduction

Revisions to the WIC Infant Food Packages

Prior to the 2009 changes in the WIC food benefits, WIC offered different infant food packages with the feeding categories of fully breast-fed (FBF) and fully formula-fed (FFF) infants. Partially breast-fed (PBF) infants received the same food benefits as FFF infants, with state WIC programs having the option to provide less infant formula when there was a greater contribution of breast milk from the mother. All infants were eligible to receive iron-fortified infant formula from 0 through 11 months of age, and infants 4 through 11 months of age could receive infant cereal and 100% juice. Revisions to the infant food packages changed the amount of infant formula available to all PBF infants and to FFF infants 4 months of age and older. The age at which infant cereal was offered by WIC increased to 6 months, juice was eliminated, and the food package now includes commercially prepared baby foods for infants 6 through11 months of age. Table 1 provides a summary of the WIC food packages for FBF, PBF, and FFF infants.

Infant Cereal. The same amount of iron-fortified infant cereals (24.oz) was offered to all infants as before the revisions to the food packages. However, in an effort to delay the introduction of complementary foods, iron-fortified infant cereals are now offered to all WIC infants at 6 months of age instead of 4 months of age in accordance with dietary recommendations.

Baby Foods. Caregivers of infants now have the ability to purchase jarred containers of baby foods for WIC infants 6 months of age and older [1]. As an incentive to prolong breastfeeding through 1 year of age as recommended, FBF infants are allotted 256 oz. (64 - 4 oz. jars) of baby food fruits and vegetables, twice the amount allotted to FFF and PBF infants. In addition, baby food meats are offered to FBF infants 6 months of age and older to address the potential for iron and zinc inadequacy[2].

100% Juice. In the new food package, 100% juice was eliminated and replaced by baby food fruits and vegetables in an effort to increase fruit and vegetable consumption and variety while reducing excess carbohydrate intake and calories.

Table 1. Original and Revised WIC Food Packages for Infants*

	Infant Participants 0 through 11 Months of Age					
	Fully Breastfed		Formula Fed		Partially Breastfed	
Food Item	Original Food Package	Revised Food Package	Original Food Package	Revised Food Package	Original Food Package	Revised Food Package
Iron-fortified infant cereal	4-11 month old (24 oz.)	6-11 months old (24 oz.)	4-11 months old (24 oz.)	6-11 months old (24 oz.)	4-11 months old (24 oz.)	6-11 months: (24 oz.)
Jar baby food- fruits and vegetables	none	6-11 months old (256 oz.)	none	6-11 months old (128 oz.)	none	6-11 months: (128 oz.)
Jar baby food-meats	none	6-11 months old (77.5 oz.)	none	none	none	none
Juice	4-11 months old (96 fl. oz.)	none	4-11 months old (96 fl. oz.)	none	4-11 months old (96 fl. oz.)	none

** Adapted from Institute of Medicine of the National Academies, WIC Food Packages: Time for a Change, National Academy Press, Washington, DC (2005), pp. 208-215, and USDA websites (http://www.fns.usda.gov/wic/regspublished/foodpackages-interimrule.htm and http://www.fns.usda.gov/wic/benefitsandservices/foodpkgallowances.HTM).*

Dietary Recommendations and Infant Feeding Practices

The Institute of Medicine[4] (IOM) recommended the WIC revisions to reinforce infant feeding recommendations and to better align infant nutrient intakes with widely established dietary recommendations from professional groups such as the American Academy of Pediatrics (AAP)[5] and the World Health Organization (WHO).[6] The dietary recommendations are based both upon the nutrients found in foods and infants' nutritional needs. For example, although 100% juice contains nutrients similar to those in fresh fruit, the fiber contained in 100% juice is negligible, and 100% juice is more likely to contribute to an excess intake of carbohydrates that can lead to diarrhea and replacement of breast milk and formula in an infant's diet. [3] There is a lack of evidence for the benefits of complementary feeding of semi-solid and solid foods to healthy infants before six months of age. [2,7] Studies have shown that the early introduction of complementary foods can be associated with inadequate intake of nutrients and energy due to decreased intake of breast milk and formula, and can produce stress on immature gastrointestinal, immune, and renal systems; [8-10] AAP and WHO recommend that the initiation of routine feeding of complementary foods should start at about 6 month of age when most infants are developmentally ready.[11, 12]

WIC and Infant Feeding Practices

WIC participants have reported lower breast feeding initiation and duration rates and higher infant formula feeding rates than non-WIC participants[13-15], and exclusive breastfeeding has been less common among WIC participants than non-WIC participants.[14] Although breastfeeding initiation rates have steadily increased among WIC mothers,[16] they have been below targeted levels. WIC has long recommended that complementary foods be introduced after infants are 6 months old, [5, 11] but modest percentages of WIC participants (as well as non-WIC participants) have introduced complementary foods to their infants at ages younger than 4 months of age.[14,17,18] WIC participation has also been associated with the early introduction of juice to infants, most commonly around 4 months of age, [3] but also with delayed introduction to cow's milk.[14,19] In view of past findings and new opportunities provided by the new WIC complementary foods for infants, there is a need to assess the impact of the food package revisions on the types, age of introduction, frequency and amount of baby foods consumed by infants who receive WIC benefits.

This report summarizes infant food consumption reported by WIC caregivers who participated in the National Food and Nutrition Surveys (NATFAN), a repeated cross-sectional study of WIC participants that was administered before and after revisions to the WIC food packages. The report provides participant demographic characteristics, descriptive statistics and summary tables to illustrate the age of introduction, types of baby foods, amount consumed, and consumption frequency of complementary foods and 100% juice among WIC infants before and after the changes.

Methods

Participants and inclusion criteria

This report includes responses representing the 49 State and Indian Territorial Organization WIC programs that participated in NATFAN surveys before and after changes in the food package. Caregivers who completed the Infant questionnaires reported on feeding and dietary practices for their infants. To produce this report, we used completed questionnaires for 12,002 infants who had received WIC foods in the past 30 days and whose caregivers provided complete and consistent responses to demographic items and questions about age of introduction, quantity, and kind of complementary baby foods. The infant age groups corresponding to the dietary recommendations for complementary feeding included 4,509 infants aged 0 through 5 months and 7,493 infants aged 6 through 11 months.

Definitions: questionnaire items used

Kinds of Baby Foods Consumed by Infants. To determine the kinds of baby foods consumed by infants in the NATFAN study before and after implementation of the WIC food package revisions, we used responses to the following questions: "*What kinds of baby food do you feed YOUR INFANT?*", where the answer choices were as follows: "*fruits, vegetables, cereal, meats, dinners, desserts, others (please specify),* and *I do not feed my infant jars/containers of baby food*."

Age of Introduction of Complementary Foods. Age of introduction to complementary baby foods and 100% juices for infants receiving WIC foods was assessed using responses to the items, "*Please choose the age at which the following foods (jarred or prepared) were first fed to YOUR INFANT: cereal; vegetables; fruits; meats; 100% juice such as apple, orange or tomato."* with the answer options: *"my infant does not eat this, less than 4 months old, 4 to 5 months old, 6 months old, 7 to 8 months old, and 9 to 11 months old*." Participants responded to each food item separately.

Frequency of Feeding Complementary Foods and 100% Juice to Infants. We determined the percentages of infants who consumed complementary baby foods and 100% juice in the NATFAN study both before and after implementation of the revised WIC food packages using the questions, "*How often does your infant do the following?: drink 100% juice such as apple, orange, or tomato; eat cereal; eat fruit; eat vegetables; eat meat.*", where the answer choices were as follows: "*never or less than once per week, 1 to 3 times per week, 4 to 6 times per week, 1 time per day, 2 times per day, 3 times per day*, and *4 or more times per day*." Each food item (100% juice, cereal, fruit, vegetables, and meat) was addressed separately. For this report, the

answer choices for *1 to 3 times per week, 4 to 6 times per week,* and *1 time per day,* were collapsed to *"*1 time per day or less,*"* and the responses for *3 times per day* and *4 or more times per day* were combined and reported as " 3 or more times per day.*"*

Results

Infant and Caregiver Participant Demographics

Table 2 shows demographic characteristics for infants and caregivers for the two surveys. The distributions of infant gender and sex, caregiver age, education level and language spoken at home were similar for NATFAN infants whose caregivers reported on complementary baby food consumption before and after the WIC food package revisions. The distributions of caregiver age and race/ethnicity were statistically different for the two surveys, but these differences were small: the mean caregiver age was 6 months higher, the proportion of Black respondents was slightly higher, and the proportions of "other" races lower, for the survey after the changes. We believe that these differences are attributable to the large sample size rather than differences that might be associated with the reported complementary baby food and 100% juice consumption.

Table 2. Infant and Caregiver NATFAN Participants Before and After Implementation of Revised WIC Food Packages (n=12,002).

Demographic Characteristics	Before		After	
	n	%	n	%
Infants				
Age				
Less than 1 month	199	3.3	179	3.0
1 to 2 months	634	10.4	521	8.8
3 to 4 months	1,066	17.5	940	15.9
5 months	489	8.0	481	8.1
6 months	874	14.3	834	14.1
7 to 8 months	1,188	19.5	1,116	18.9
9 to 10 months	1,258	20.6	1,364	23.1
11 months	392	6.4	467	7.9
Total	6,100	100	5,902	100
Sex				
Boy	3,093	50.7	2,958	50.1
Girl	3,007	49.3	2,944	49.9
Total	6,100	100	5,902	100
Caregivers				
Mean age (*SD*)	24.7	(*6.4*)	25.2	(*6.4*)
	n	%	n	%
Race				
White	2,890	47.4	2,806	47.5
Hispanic	1,673	27.4	1,641	27.8
Black	799	13.1	888	15.0
Others	738	12.1	567	9.6
Total	6,100	100	5,902	100
Education				
Less than high school	1,305	21.4	1,158	19.6
High school and GED	2,009	32.9	1,930	32.7
At least some college	2,359	38.7	2,395	40.6
College graduates	427	7.0	419	7.1
Total	6,100	100	5,902	100
Language spoken at home				
English	4,637	76.0	4,446	75.3
Both Spanish and English	771	12.6	764	12.9
Spanish	593	9.7	609	10.3
Other	99	1.6	83	1.4
Total	6,100	100	5,902	100

Kinds of Baby Foods Consumed by Infants on WIC

What kinds of baby foods do you feed your infant? Table 3 shows the percentages of infants consuming different kinds of baby foods before and after implementation of the revised infant food packages. About 60% of the infants younger than 6 months of age were not fed prepared baby food before and after the changes, while very small percentages of older infants did not eat these foods. Among the young infants who ate baby foods, cereal, fruit, and vegetables were the most commonly consumed, and small percentages of these younger infants ate baby food meats, dinners, desserts or other baby foods before and after the changes.

Table 3. Kinds of Baby Food Consumed by Infants in NATFAN Study Before and After the WIC Food Package Revisions (n = 12,002).

Kinds of Baby Food Consumed	Infant Age							
	0 through 5 months				6 through l1 months			
	Before (n=2,388)*		After (n=2,121)*		Before (n=3,712)*		After (n=3,781)*	
	n	%	n	%	n	%	n	%
Fruit**	550	23.0	572	27.0	3,318	89.4	3,575	94.6
Vegetables**	498	20.9	502	23.7	3,265	88.0	3,505	92.7
Cereal**	759	31. 8	676	31.9	3,152	84.9	3,145	83.2
Meats	47	2.0	61	2.9	1,516	40.8	1,533	40.5
Dinners	62	2.6	61	2.9	1,510	40.7	1,190	31.5
Dessert	43	1.8	48	2.3	1,174	31.6	821	21.7
Others	70	2.9	45	2.1	187	5.0	217	5.7
Do not feed jars/containers of baby food	1,458	61.1	1,256	59.2	109	2.9	77	2.0

**Food totals do not equal 100% because participants could select multiple response options.*

*** Baby food fruits and vegetables were not offered in the old WIC infant food package and were offered to infants aged 6 months and older in the new WIC infant food package. Cereal was offered to infants aged 4 through11 months of age in the previous WIC infant food package and infants 6 through 11 months of age in the new WIC infant food package*

Although WIC did not offer prepared baby foods to infants under 6 months of age before or after the changes in the food package, over 20% of young infants were reported to be eating fruits and vegetables and over 30% were eating cereal in the surveys conducted before and after the changes. Among older infants, the percentages of infants who ate baby food fruits and vegetables were higher (more than 90% of infants) after the changes, and over 80% ate infant cereal, with a slightly smaller percentage of older infants eating cereal following the changes. About 40% of infants aged 6 through 11 months ate baby food meats before and after the changes. The proportions of infants who ate baby food dinners and desserts (not offered by WIC) were about 10 percentage points lower following the changes. Among both younger (1 through 5 months) and older (6 through 11 months) infants, greater percentages of infants were eating baby food fruits and vegetables following the changes.

Age of Introduction and Consumption Frequency of Complementary Baby Foods

Please choose the age at which the following foods (jarred or prepared) were first fed to your infant.

A key question for this report is the age of introduction of complementary foods for infants. Table 4 shows the age of introduction of cereal, jarred/prepared baby foods, and juice before and after the food package changes for infants according to age.

Table 4. Percentages of NATFAN Infants Introduced to Baby Foods Before and After Implementation of Revised WIC Food Packages (n=12,002)*

Age First Fed	Cereal		Fruit		Vegetables		Meats		100% Juice	
	Before	After	Before	After	Before	After	Before	After	Before	After
Less than 4 months	23.0	22.1	7.3	7.7	6.0	6.2	1.1	0.9	7.9	7.1
4 to 5 months	38.3	37.5	33.7	36.3	34.1	36.4	6.9	7.8	19.0	17.2
6 months	10.7	13.5	20.9	23.5	21.3	24.1	14.0	15.3	18.4	17.6
7 to 8 months	2.0	1.9	5.2	4.3	4.9	4.0	12.8	12.4	8.5	9.0
9 to 11 months	0.3	0.6	0.7	0.8	0.6	0.7	4.0	4.3	1.6	2.7
Infant does not eat this	25.7	24.4	32.3	27.4	33.1	28.5	61.1	59.2	44.6	46.4

* "Before" survey n = 6100; "After" survey n = 5902)

Although WIC foods did not include infant cereal for infants younger than four months of age before or after the changes, cereal was introduced to over 20% of infants by the age of four months before and after the changes. Almost 60% of the NATFAN infants had been introduced to cereal before the age of six months before the changes, with a slightly smaller percentage introduced to cereal before age 6 months after the changes. The proportion of caregivers who first fed their infants cereal at 6 months of age was greater after the changes. Fruits and vegetables were offered to about 1/3 of the NATFAN infants at four to five months of age, even though WIC did not offer baby food fruits and vegetables for infants at this age. Small percentages of infants were first introduced to fruits, vegetables, meats, and 100% juice before the age of four months.

Q42, 44-47. How often does your infant do the following?

Tables 5 – 9 illustrate the frequency of consumption for infant cereal, fruits, vegetables, meats, and 100% juice before and after the WIC food changes. None of the foods except 100% juice were offered by WIC in the old food packages. Table 5 shows frequency consumption for infant cereal before and after the changes. Most young infants consumed cereal "never or less than once per week" both before and after the changes. Comparing the reported frequency for cereal consumption in Table 5 with age of introduction shown in Table 4 suggests that although infants may have been introduced to infant cereal at an early age, they did not eat it very often.

Almost 12% of infants 0 through 5 months of age did consume cereal two or more times per day; however, the proportion was lower after the changes. The majority of infants both in the 0 through 5 month age group and the 6 through 11 months of age consumed cereal once a day or less often, both before and after the WIC food package changes.

Table 5. Cereal Consumption Frequency for Infants in NATFAN Study Before and After Implementation of the Revised WIC Food Packages (n=12,002).

Consumption Frequency	Infant age							
	0 through 5 months				6 through 11 months			
	Before (n=2,388)		After** (n=2,121)		Before (n=3,712)		After** (n=3,781)	
	n	%	n	%	n	%	n	%
Never or less than once per week	1,520	63.7	1,340	63.2	309	8.3	374	9.9
Less than 1 time per day	374	15.7	354	16.7	1,239	33.4	1,222	32.3
1 time per day	211	8.8	206	9.7	1,090	29.4	1,057	28.0
2 or more times/day*	183	11.8	221	10.4	1074	28.9	1128	29.9

* *Frequency responses consolidated*

Fruit.

The majority of caregivers fed their young infants (0 through 5 months) fruit less than once a day, with a slightly larger proportion feeding fruit 1 time per day or more after the changes. Among older infants, the percentage of infant eating fruit "never or less than once per week" dropped from over 7% before the changes to about 4% after the changes. The percentage of infants 6 through 11 months old who ate fruit at least once a day increased from about 62% before the changes to almost 70% after the changes (Table 6).

Table 6. Fruit Consumption Frequency for Infants in NATFAN Study Before and After Implementation of the Revised WIC Food Packages (n=12,002).

Consumption Frequency	Infant age							
	0 through 5 months				6 through 11 months			
	Before (n=2,388)		After** (n=2,121)		Before (n=3,712)		After** (n=3,781)	
	n	%	n	%	n	%	n	%
Never or less than once per week	1,859	77.8	1,591	75.0	278	7.5	183	4.8
Less than 1 time per day	297	12.4	268	12.6	1,132	30.5	964	25.5
1 time per day	142	5.9	143	6.7	982	26.5	978	25.9
2 or more times/day*	90	3.8	119	5.7	1320	35.6	1656	43.8

* *Frequency responses consolidated*

Vegetables. Vegetable consumption among NATFAN infants was similar to that for fruit (Table 7). After the changes, almost 70% of caregivers reported feeding their infants 6 through 11 month vegetables once a day or more often, compared to about 62% feeding vegetables at least once a day before the changes.

Table 7. Vegetable Consumption Frequency for Infants in NATFAN Study Before and After Implementation of the Revised WIC Food Packages (n=12,002).

Consumption Frequency	Infant age							
	0 through 5 months				6 through 11 months			
	Before (n=2,388)		After** (n=2,121)		Before (n=3,712)		After** (n=3,781)	
	n	%	n	%	n	%	n	%
Never or less than once per week	1,888	79.1	1,642	77.4	295	7.9	216	5.7
Less than 1 time per day	263	11	235	11.1	1,104	29.7	921	24.4
1 time per day	147	6.2	144	6.8	1,010	27.2	968	25.6
2 or more times/day*	90	3.8	100	4.7	1303	35.1	1676	44.3

* *Frequency responses consolidated*

Meats. Baby food meats were only offered to fully breastfed WIC participants 6 through 11 months of age after changes to the WIC food packages. Among NATFAN respondents, very few young infants ate baby food meats, and the majority of older infants did not eat them daily. Over

90% of infants 0 through 5 months and over 40 % of infants 6 through 11 months ate baby food meats "*never or less than once a week*" (Table 8) both before and after changes.

Table 8. Baby Food Meat Consumption Frequency for Infants in NATFAN Study Before and After Implementation of the Revised WIC Food Packages (n=12,002).

Consumption Frequency	Infant age							
	0 through 5 months				6 through 11 months			
	Before (n=2,388)		After** (n=2,121)		Before (n=3,712)		After** (n=3,781)	
	n	%	n	%	n	%	n	%
Never or less than once per week	2,323	97.3	2,052	96.7	1,635	44	1,668	44.1
Less than 1 time per day	33	1.4	42	2.0	934	25.2	857	22.7
1 time per day or more*	32	1.4	27	1.3	1143	30.8	1256	33.2

* *Frequency responses consolidated*

Juice. Consumption frequency of 100% juice by infants 0 through 5 months old was similar both before and after the changes, with most infants consuming 100% juice never or less than once per week (Table 8). Among older infants, juice consumption frequency was lower following the food package changes; although most older infants drank juice, the proportions of infants drinking it one or more times a day were lower for the NAFTAN survey following the changes.

Table 9. 100% Juice Consumption Frequency for Infants in NATFAN Study Before and After Implementation of the Revised WIC Food Packages (n=12,002).

Consumption Frequency	Infant age							
	0 through 5 months				6 through 11 months			
	Before (n=2,388)		After** (n=2,121)		Before (n=3,712)		After** (n=3,781)	
	n	%	n	%	n	%	n	%
Never or less than once per week	2,028	84.9	1,786	84.2	938	25.3	1,251	33.1
Less than 1 time/day	247	10.3	241	11.4	1,634	44.0	1,555	41.1
1 time per day	72	3.0	61	2.9	605	16.3	528	14.0
2 or more times/day	41	1.7	33	1.6	535	14.4	447	11.9

* *Frequency responses consolidated*

Quantity of Baby food Fed. Table 10 displays the average number of jars/containers of baby food per week fed to infants before and after food packages changes. The means for baby food jars/ containers were similar for infants under five months of age before and after the WIC changes, with five-month-old infants consuming about one jar of baby food per day before and after the changes. However, the average number of jars/containers of baby food consumed per week by infants 6 through 11 months was significantly higher ($t = 4.9$, $df = 4$, $p < .01$) after the food package revisions.

Table 10**.** Mean Jars/Containers of Baby Food Per Week by Infant Age (n = 9,102)*

Age of Infant	Before Mean (*SD*)	After Mean (*SD*)
Less than 1 month	0.3 (1.2)	0.00 (0)
1 to 2 Months	1.5 (3.6)	1.9 (3.6)
3 to 4 Months	4.3 (6.9)	4.4 (5.5)
5 months	6.8 (8.5)	7.7 (8.6)
6 Months	9.6 (8.0)	11.0 (9.8)
7 to 8 Months	12.1 (10.7)	13.9 (10.4)
9 to 10 Months	12.8 (9.3)	16.0 (11.7)
11 Months	13.1 (12.2)	15.4 (11.6)

* *Only infants who consumed baby foods are included.*

Discussion

According to dietary recommendations for infants, caregivers should combine complementary foods with breast milk or formula starting about 6 months of age to provide the full range of nutrients needed for optimal infant growth, development, and health. NATFAN results indicate that WIC caregivers most often introduced complementary foods and 100% juice to infants at 4 to 5 months of age, with the exception of baby food meat which was most often introduced at 6 to 8 months of age.

The highest proportions of infants were first introduced to infant cereals at four to five months of age before and after revisions in the WIC food packages. These results are similar to findings from the Infant Feeding Practices Study II in which 18% of infants were consuming infant cereal by 3 months of age and 40% by 4 months of age [20]. NATFAN results suggest that although solids are introduced early to infants, infants do not consume cereal very often. Caregivers may be continuing to follow the infant feeding practice (not endorsed by AAP) of adding infant cereal to the infant's bottle at bedtime to improve infant sleep[21]. Caregivers would be purchasing baby food infant cereals using non-WIC resources since WIC only provided cereal to infants 4 months and older before the revisions and to infants 6 months and older after the revisions to the WIC food packages.

The percentage of infants who did not drink 100% juice was greater after the food package changed, and a smaller percentage of infants were first introduced to 100% juice before 6 months of age. Smaller percentages of WIC caregivers introduced 100% juice, fruits and vegetables to their infants at ages younger than 4 months of age in the NATFAN survey after the changes.

Fruit and vegetable baby foods (not offered in the original WIC food packages) are now offered at 6 months of age and replace 100% juice (no longer offered in the WIC infant food packages). Although it is not clear why there were slightly greater proportions of infants being introduced to fruits and vegetables at 4 and 5 months of age after the implementation of the revised food packages, FFF infants were allotted additional formula and this could have possibly allowed caregivers to use more funds for baby foods. Furthermore, PBF infants should have a greater contribution of breast milk based on intended results of the PBF infant food packages, which might also allow caregivers to have a larger allotment for baby foods in their budget instead of buying additional formula to supplement breast milk.

Patterns in fruit, vegetable, and juice consumption after implementation of the revised WIC food packages shifted in the anticipated direction, with larger proportions of older infants consuming fruit and vegetables 2 or more times a day. Baby food meats offered to FBF infants 6 months of age and older should continue to reduce the prevalence of iron and zinc inadequacy[2]; however, baby food meats are not a popular baby food of choice for infants of any age and the proportions of infants consuming baby food meats were similar both before and after implementation of the revised WIC food packages.

Participation in the WIC program is designed to improve diet quality and nutritional outcomes of infants from birth through 11 months of age by promoting exclusive breastfeeding and the delay of complementary foods until 6 months. WIC offers baby food cereals, meats, fruits and vegetables as supplements to breast milk and formula feeding for infants aged six months and older. [1,4] In this report, we used results from NATFAN surveys of caregivers to infants 0 through 11 months of age to look at the impact of the food package revisions on the age of introduction, consumption frequency and amount of complementary foods consumed by infants receiving WIC. Although results did not show large differences after the food package revisions, the proportions are shifting in favorable directions for cereal, fruit, vegetables and 100% juice for infant 6 through 11 months of age. Our finding of early introduction of complementary foods for infants younger than four months of age implies that educational efforts should continue to emphasize the delay of introducing these foods until the infant is 6 months old.

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Beverage Consumption by NATFAN WIC Participants Before and After WIC Food Package Changes

Is the reduction in the quantity of juice available from WIC associated with less juice consumption? In addition, did the reduction in quantity of juice in the WIC package lead to an increase in consumption of other non-nutritive sugary drinks?

Abstract

This report describes beverage consumption reported in the National Food and Nutrition Surveys carried out in 49 State and Territorial WIC Programs before and after changes in the WIC food benefit. Respondents included 24,813 women and 40,717 children aged one through four who had received WIC foods in the past 30 days. Women attending WIC clinics during the survey periods responded to questions about their own (Women questionnaire) or their child's (Child questionnaire) dietary practices, including the frequency of consumption of 100% juice, artificially sweetened drinks and sugar sweetened drinks. Summary results did not show a reduction in the frequency of consumption of 100% juice by women and children after the WIC changes. On the other hand, NATFAN results did not reflect increases in the frequency of consumption of artificially sweetened and sugar sweetened beverages by women and children.

Summary

What is the issue?

The 2009 food package revisions reduced the amount of 100% juice provided to women and children participating in WIC. In view of these changes, it is important to learn whether the frequency of consumption of 100% juice was lower after the WIC changes. Were there any unintended consequences as a result of this reduction, such as an increase in the frequency of consumption of artificially sweetened and sugar-sweetened beverages by women and children?

What did the study find?

Reduction in the amount of 100% juice provided by WIC did not result in any significant reduction in the frequency of consumption of 100% juice by women and children. Over 30% of women and 40% of children were drinking 100% juice two or more times per day before and after the food package changes. On the other hand, NATFAN respondents did not report increases in the frequency of consumption of artificially sweetened and sugar sweetened beverages following the WIC changes.

How was the study conducted?

The NATFAN study was conducted with WIC participants in 49 State and Indian Tribal Organization WIC Programs before and after the revision of the food package in 2009. To produce this report, we used completed NATFAN questionnaires representing women and children aged one through four years who had received WIC foods in the past 30 days. We provide summary tables and demographic information for responses representing 24,813 women and 40,717 children who reported on the frequency of consumption of juice, artificially sweetened beverages and sugar sweetened beverages.

Introduction

Fruit juices have been recommended by pediatricians and often marketed as a healthy low-fat, vitamin-rich, nutritious beverages, and over the years consumption has increased dramatically, with children being the largest consumers.[1] Fruit juice accounts for 50% of all fruit servings consumed by children aged 2 through 18 years, and 1/3 of all fruits and vegetables consumed by preschoolers.[2] According to Wang et al, [3] preschool children consumed, on average, 10 oz of 100% juice daily. The 2002 Feeding Infants and Toddlers study[4] noted higher percentages of 12-24 month old WIC participants were consuming 100% juice than non WIC participants. WIC participants may perceive 100% juice as healthful and introduce it to their children earlier.[5]

Juices are often fortified with calcium and vitamin C. Studies have shown that vitamin C and flavonoids in juice may have beneficial long-term health effects, such as decreasing the risk of cancer and heart disease[6] and drinks containing vitamin C consumed simultaneously with food can increase iron absorption by twofold.[7]Although juice consumption has benefits, it also has potential detrimental effects. Excessive juice consumption and the resultant increase in caloric intake have been linked to increased risk for childhood overweight and obesity.[8,9] While some evidence suggests that juice consumption has no association with the incidence of overweight[10], feeding juice in bottles and increased consumption of juices has been found to lead to dental caries in children.[11] In addition, excessive juice consumption is closely linked to the malabsorption of carbohydrates (resulting in chronic diarrhea, abdominal pain, bloating, and flatulence) and abnormal growth patterns.[1,8]

Sugar sweetened beverages include soda, sports drinks, sweetened tea, and other fruit drinks. Sugar sweetened beverages such as carbonated soft drinks have high added sugar content, low satiety and incomplete compensation for total energy, and have been suggested as a key contributor to obesity.[12] These drinks are also associated with risk factors for type 2 diabetes.[13] Sugar-sweetened beverages accounted for 48% of the beverage purchases made by WIC-only households in a study reported in 2012.[14]

With increasing evidence of sugar sweetened beverages leading to excess weight gain, people are turning to artificially sweetened beverages such as diet soda and Crystal Light. Current research has conflicting evidence[15] about the role of artificially sweetened beverages in weight gain, but studies indicate that there is a cause for concern that artificial sweeteners might lead to increased cravings for sweet food and thereby increasing appetite and weight gain.[16, 17] The Dietary Guidelines for Americans (DGAs) [18] recommend limiting intake of 100% juice to 4 to 6 oz daily, and restricting other sugared or artificially sweetened beverages to occasional use.

Revisions to the WIC food package

The quantity of juice provided in the old WIC food package was much higher than the amounts recommended for women and children.[19] In alignment with the recommendations from the DGAs, the amount of juice for women and children was reduced in the new food packages to allow for the inclusion of whole fruits and vegetables. [19] For women, including those who are exclusively breastfeeding, the maximum amount of juice offered by WIC was reduced to 144 fl oz. (96 fl oz for postpartum women), and the amount provided for children was decreased from 288 fl oz to 128 fl oz. (about 4 ounces per day), which is consistent with the DGAs and AAP (American Academy of Pediatrics) recommendations for children.

The objective of this report is to determine the frequency of consumption of 100% juice by women and children before and after revisions to the WIC food package. This report provides beverage consumption information for women and children who participated in the National Food and Nutrition Questionnaire (NATFAN), a repeated cross-sectional survey of WIC participants. The report includes participant demographic characteristics, descriptive statistics and summary tables to determine whether the reduction in the amount of juice in the food packages for women and children resulted in less frequent consumption of 100% juice. In addition, we also address potential unintended consequences such as an increase in the frequency of consumption of artificially sweetened and sugar sweetened beverages by women and children.

Methods

Participants and inclusion criteria

This report includes responses representing the 49 State and Indian Territorial Organization WIC programs that participated in NATFAN surveys before and after changes in the food package; participants who completed the Women questionnaire reported on their own dietary practices and those who completed the Child questionnaire reported on their child's dietary practices. In this report we describe reported beverage consumption for 24,813 women and 40,717 children who had received WIC foods in the past 30 days and who provided complete and consistent responses to demographic items and questions about frequency of consumption of 100% juice, artificially sweetened beverages and sugar sweetened beverages.

Definitions: questionnaire items used

Frequency of consumption. To determine the frequency of consumption of 100% juice, artificially sweetened beverages and sugar sweetened beverages before and after WIC food package revisions, we used responses to the questions, "*How often do YOU* (women questionnaire) */does your child* (child questionnaire)*"* do the following: *Drink 100% Juice such as orange, apple or tomato? Drink artificially sweetened drinks such as diet cola, diet soda, crystal light? Drink sugar sweetened drinks such as Kool Aid, cola, sports drinks or sugar sweetened tea?* The response options were: *never or less than once per week, 1 to 3 times per week, 4 to 6 times per week, 1 time per day, 2 times per day, 3 times per day,* and *4 or more times per day*. We consolidated and reported responses for the last two options using the category, "2 or more times per day".

Results

Women

Table 2 provides characteristics for pregnant, breastfeeding or postpartum women in the NATFAN study who responded to the questions relating to beverage consumption, provided complete demographic information, and had received WIC foods in the past 30 days.

Table 2. Demographic Characteristics for Women NATFAN Participants Who Reported on Beverage Consumption Before and After the Food Package Changes (n=24,813).

Characteristics	Before (n =11,399)		After (n =13,414)	
Mean age (SD)	25.4	(6.14)	25.4	(6.40)
	n	%	n	%
Race**				
White	4,468	39.2	5,228	39.0
Hispanic	4,185	36.7	5,122	38.2
Black	1,576	13.8	1,854	13.8
Others	1,170	10.3	1,210	9.0
Education**				
Less than high school	3,408	29.9	3,869	28.8
High school and GED	3,871	34.0	4,414	32.9
At least some college	3,516	30.8	4,263	31.8
College graduates	604	5.3	868	6.5
Language spoken at home				
English	7,797	68.4	8,884	66.2
Both Spanish and English	1,523	13.4	1,988	14.8
Spanish	1,888	16.6	2,361	17.6
Other	191	1.7	181	1.3
Pregnancy status**				
Pregnant	4,592	40.3	5,234	39.0
6 months or less postpartum	5,074	44.5	5,682	42.4
Breastfeeding	2,434	21.4	2,873	21.4

** "Race" and "Education" categories were consolidated from multiple response options.*

*** Separate questionnaire items; totals do not equal 100%*

The distributions of women NATFAN participants according to age and pregnancy status were similar for the surveys conducted before and after the WIC changes. The distributions of race, educational levels, and language spoken at home were significantly different statistically, with slightly higher percentages of Hispanic and "other" race categories and Spanish as the language spoken at home for the survey conducted following the changes. We do not believe that these differences or the differences in distributions of educational levels were meaningful in regard to beverage consumption before and after the WIC food changes.

Frequency of 100% Juice Consumption

Table 3 shows reported frequency of 100% juice consumption among women before and after the food package changes.

Table 3. Consumption of 100% Juice by Women in the NATFAN Study Before and After Food Package Revisions (N =24,813).*

Frequency of juice consumption	Before (n =11,399)		After (n =13,414)	
	n	%	n	%
Never or less than once/week	735	6.4	1,111	8.3
Less than once per day	4,826	42.3	6,176	46.0
1 time per day	1,679	14.7	1,965	14.6
2 times per day	1,975	17.3	2,139	15.9
3 or more times per day	2,184	19.2	2,023	15.1

**Totals represent responses from participants who answered all beverage questions.*

Most women respondents were consuming 100% juice less than once a day before and after the food package changes. There were slightly smaller percentages of women consuming 100% juice two or more times/day after the food package changes, but over 30% of the women respondents were consuming 100% juice two or more times per day even after the amount of juice provided to them by WIC was reduced in half.

Frequency of Consumption of Artificially Sweetened Beverages

Table 4. Artificially Sweetened Drinks Consumption by Women in the NATFAN Study Before and After Food Package Revisions (N =24,813).*

Frequency of artificially sweetened drinks consumption**	Before (n =11,399)		After (n =13,414)	
	n	%	n	%
Never or less than once/week	5,619	49.3	6,642	49.5
Less than once per day	3,630	31.8	4,314	32.2
1 time per day	988	8.7	1,173	8.7
2 times per day	652	5.7	726	5.4
3 or more times per day	510	4.5	559	4.2

**Totals represent responses from participants who answered all the beverage questions*

***Not a WIC food before or after changes*

As seen in Table 4, the frequency of consumption of artificial drinks reported by NATFAN women showed little change after the food package changes. Of the NATFAN women who responded to the beverage questions, over 80% consumed artificial drinks less than once per day.

Frequency of Consumption of Sugar Sweetened Beverages

The reported consumption of sugar-sweetened drinks shown in Table 5 reflects that over 65% of NATFAN women consumed sugar sweetened beverages less than once per day before and after the changes. However, about 20% of the women in both surveys reported drinking sugary drinks twice a day or more often, before and after the changes.

Table 5. Frequency of Sugar-Sweetened Drinks Consumption By Women in the NATFAN Study Before and After Food Package Revisions (n =24,813).*

Sugar-sweetened drinks** consumption	Before (n =11,399)		After (n =13,414)	
	n	%	n	%
Never or less than once/week	2,631	23.1	3,327	24.8
Less than once per day	5,089	44.6	5,975	44.5
1 time per day	1,341	11.8	1,563	11.7
2 times per day	1,084	9.5	1,212	9.0
3 or more times per day	1,254	11.0	1,337	10.0

**Totals represent responses from participants who answered all the beverage questions*

***Not a WIC food before or after changes*

Children

Demographics

Table 6 provides characteristics for one through five year old children and their caregivers in the NATFAN study who responded to the questions relating to beverage consumption, provided complete demographic information, and whose children had received WIC foods in the past 30 days.

Table 6. Demographic Characteristics For Children NATFAN Participants With Reported Beverage Consumption Before And After The Food Package Changes (N=40,717).*

Characteristic	Before (n =19,997)		After (n =20,720)	
Children				
Mean age (*SD*) in Months	31.0 (*13.31*)		31.4 (*13.31*)	
	n	%	n	%
Males	10,315	51.6	10,642	51.4
Females	9,682	48.4	10,078	48.6
Caregivers				
Mean age (*SD*)	28.0 (*7.72*)		28.5 (*7.59*)	
Race**				
White	9,417	47.1	9,369	45.2
Hispanic	5,530	27.7	6,242	30.1
Black	2,742	13.7	3,076	14.8
Others	2,308	11.5	2,033	9.8
Education**				
Less than high school	4,332	21.7	4,313	20.8
High school and GED	6,912	34.6	6,911	33.4
At least some college	7,200	36.0	7,754	37.4
College graduates	1,553	7.8	1,742	8.4
Language spoken at home				
English	15,021	75.1	15,114	72.9
Both Spanish and English	2,577	12.9	2,971	14.3
Spanish	2,095	10.5	2,282	11
Other	304	1.5	353	1.7

** "Race" and "Education" categories were consolidated from multiple response items*

*** Separate questionnaire items; totals do not equal 100%*

As was the case for women NATFAN participants, the distributions of caregivers' age, race, educational level, and language spoken at home were statistically significantly different, with a mean age 6 months greater, higher percentages of Hispanic and Black participants and lower percentages of White and "other" race categories, and higher percentages of participants with college-level education for the survey conducted following the changes. The mean age for children, while also statistically significant, represented a difference of less than two weeks in the mean ages for the two surveys. We do not believe that these differences are associated with reported beverage consumption among NATFAN children.

Frequency of Consumption of 100% Juice

As seen in Table 7, the frequency of consumption of 100% juice was similar before and after the food package change changes, even though the amount of 100% juice provided to WIC children was reduced by half. Over 40% of children were drinking 100% juice two or more times per day before and after the changes, with slightly lower percentages drinking 100% juice three or more times per day and slightly higher percentages were drinking 100% juice less than once per day.

Table 7. Juice Consumption by Children in the NATFAN Study Before and After Food Package Revisions (N = 40,717)*.

100% Juice consumption frequency	Before (n = 19,997)		After (n = 20,720)	
	n	%	n	%
Never or less than once/week	774	3.9	975	4.7
Less than once per day	6,571	32.9	7,073	34.1
1 time per day	3,445	17.2	3,579	17.3
2 times per day	5,132	25.7	5,234	25.3
3 or more times per day	4,075	20.4	3,859	18.6

**Totals represent responses from participants who answered all the beverage questions*

Frequency of Consumption of Artificially Sweetened Beverages

As seen in table 8, very small percentages of NATFAN children drank artificially sweetened drinks. Over 90% of children were drinking these less drinks less than once per day.

Table 8. Artificially Sweetened Drink Consumption by Children in the NATFAN Study Before and After Food Package Revisions (N = 40,717).*

Frequency of Artificial drinks** consumption	Before (n = 19,997)		After (n = 20,720)	
	n	%	n	%
Never or less than once/week	14,564	72.8	15,072	72.7
Less than once per day	4,348	21.7	4,456	21.5
1 time per day	659	3.3	726	3.5
2 times per day	277	1.4	300	1.4
3 or more times per day	149	0.7	166	0.8

**Totals represent responses from participants who answered all the beverage questions*

***Not a WIC food before or after changes*

Frequency of Consumption of Sugar-Sweetened Beverages

As seen in table 9 the frequency of consumption of sugar sweetened drinks by NATFAN children, similar to that for the NATFAN women, did not change much after the food package changes. Over 85% of the NATFAN children were consuming artificially sweetened drinks less than once per day.

Table 9. Frequency of Sugar-Sweetened Drink Consumption by Children in the NATFAN Study Before and After Food Package Revisions (N = 40,717).*

Sugar sweetened drinks** consumption	Before (n = 19,997)		After (n = 20,720)	
	n	%	n	%
Never or less than once/week	8,966	44.8	9,202	44.4
Less than once per day	8,299	41.5	8,731	42.1
1 time per day	1,402	7.0	1,417	6.8
2 times per day	818	4.1	823	4
3 or more times per day	512	2.6	547	2.6

** Totals represent responses from participants who answered all the beverage questions*

***Not a WIC food before or after changes*

Discussion

Until the 2009 revisions, WIC food packages provided only juice and no fruits and vegetables to participants. With concern that children were consuming too much juice and not enough fruits and vegetables, the amount of juice provided was reduced and fruits and vegetables were introduced into the food package.

Our study showed that slightly lower percentages of women and children were drinking 100% juice "two or more times/day" and slightly higher percentages were drinking it "less than one time/day" after the changes. While this suggests a slight shift towards reduced consumption of juice, over 30% of women and 40% of children were still drinking 100% juice two or more times per day after the WIC food package changes.

Consumption of artificially sweetened beverages by NATFAN women and children did not change after the food package changes. Reported consumption of these drinks was infrequent; with over 80% of women and 90% of children consuming artificially sweetened drinks less than once a day before and after the food package changes. Similarly, frequency of consumption of sugar sweetened drinks by NATFAN women and children did not change after the food package changes. Over 65% of women and 85% of children were consuming sugar sweetened drinks less than once a day before and after the food package changes. Sugar-sweetened beverages were consumed at higher frequencies than artificially sweetened beverages. and women consumed these drinks at higher frequencies than children.

While a recent scanner data study[20] in New England showed that 100% juice purchases by WIC households after the food package changes reduced by a quarter, our study findings did not reveal any significant reduction in the frequency of consumption of 100% juice. While this was not a move in the right direction, our findings do suggested that WIC participants did not increase their consumption frequency of artificially sweetened and sugar-sweetened beverages following the WIC reduction in 100% juice.

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Chapter I. Survey Background and Administration

This report provides documentation for data from the National Food and Nutrition survey (NATFAN), a multi-state project to assess changes in WIC participant food and nutrition behavior before and after implementation of the new WIC food package. The data were collected using questionnaires for Women, Infants, and Children, which were administered to participants from State, Territorial, and Indian Tribal Organization (ITO) WIC Programs between 2009 and 2011.

During 2009, 39 states and 11 Indian Tribal Organization WIC programs (ITOs) participated in administering questionnaires in WIC clinics before the food package revisions. The survey was re-administered at least six months following the food package changes, late in FY2010 and early FY 2011, with one additional state and 7 additional ITO WIC Programs participating. State-level participation in the NATFAN project was voluntary. State WIC Programs in Delaware, Maine, Michigan, Minnesota, New York, North Dakota, Oklahoma, South Carolina and Utah did not participate, and the WIC Program in Ohio participated only in the post-implementation survey. Individual WIC Programs administered surveys using convenience samples of women and caregivers of infants and children who attended WIC clinics during the data collection periods. All study procedures were examined and determined to be exempt from full review by the Institutional Review Board (IRB) of Texas A&M University; some individual state health agencies also made exempt or expedited IRB reviews according to state requirements. All participants provided consent; survey questionnaires did not include personally identifiable information and non-participation did not affect WIC benefits.

Questionnaire development

Questionnaire development was based on a state WIC questionnaire developed and field tested in Texas[1], with the wording and construction of the fruit and vegetable items based on the United States Center for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System questions[2], and the demographic, age, and childbearing status questions mirroring those used in WIC certification eligibility determinations. An expert panel of State WIC Directors, representatives from the National WIC Association, and staff from the United States Department of Agriculture Food and Nutrition Services reviewed the Texas questionnaire items for content validity and provided recommendations to shorten the length of the survey by using separate questionnaires for women, infants, and children. Following these

[1] McKyer, E.L.J., Vaughn, K., Murano, P.S., Girimaji, A., Baxter, S., Spaulding, C.J., Tisone, C.A. & Ory, M.G. 2011, Development and testing of the Texas WIC's Food and Nutrition Questionnaire, *Texas Public Health Journal*, vol. 63, no. 1, pp. 46-49.

[2] United States Center for Disease Control and Prevention. 2009, *Behavioral Risk Factor Surveillance System Questionnaire*. Available: http://www.cdc.gov/brfss/questionnaires/pdf-ques/2007brfss.pdf [2011, 01/29].

recommendations, the final survey instruments include three questionnaires, with English and Spanish versions.

The NATFAN questionnaires are paper, scannable documents completed in pencil. The survey instruments include 99 items distributed among the questionnaires for women (31 items), infants (36 items), and children (32 items). In the questionnaire for women, 4 items address fruit and vegetable consumption frequency and variety; 8 items address consumption frequency of whole or refined grains; 6 items address the frequency, consumption, type, and willingness to consume milk; and 4 items address consumption frequency for fruit juice and other beverages (sugar-sweetened, artificially-sweetened, and soy milk).

In the questionnaire for infants, 14 items address breastfeeding duration, infant formula feeding, and age of introduction and frequency of consumption of beverages. Twelve items address prepared infant food consumption, frequency, and age of introduction.

In the questionnaire for children, 4 items address fruit and vegetable consumption frequency and variety; 8 items address consumption frequency of whole or refined grains; 6 address consumption amounts, frequency, and type of milk consumed, and willingness of caregiver to offer milk; and 4 items address consumption frequency for fruit juice and other beverages. Five identical demographic questions appear at the end of each of the three questionnaires. The NATFAN questionnaires appear in Appendix B.

Survey sampling and administration protocols

Each participating state program designated a contact person, who received a suggested sampling protocol tailored to the specific geographic, tribal, and territorial program. The protocols included: 1) the minimum sample size needed, 2) a recommended sampling and administration protocol, and 3) all materials and protocols required to obtain acceptable response rates. Participating states/territories were encouraged to utilize the standard sampling protocol unless the WIC program determined that doing so at the local agency level would adversely impact recruitment and/or compromise sample size. In those cases, convenience sampling protocols were used and recorded. The national sample size of surveys distributed for both the pre-and post-implementation surveys was approximately 190,000.

The sampling protocols permitted flexibility to help ensure minimal interference with WIC clinic activities. [1, 2] Research team members suggested that State WIC Programs distribute 2,500 English surveys for medium and large programs and correspondingly smaller numbers for smaller programs, in addition to a number of Spanish surveys that reflected the state's Hispanic population according to fiscal year 2006 USDA data. The researchers also suggested sampling protocols that would provide for ethnic representation (including the major races and ethnicities represented within about 60% of each state's population) and a broad range of geographic areas that included smaller clinics as well as larger, urban WIC programs. Unless program representatives requested otherwise, the survey material packets contained approximately 25% of the surveys for women, 25% for infants, and 50% for children, roughly corresponding to the eligibility group distribution for the national WIC program.

Surveys and administration instructions were sent either to the state contact or to individual local WIC agencies. The survey questionnaires were distributed in waiting rooms, classrooms, mailed directly to clients (isolated regions in Alaska), and during counseling or

educational sessions with WIC staff. Local WIC agency staff administered the surveys and returned them, either directly or through the state contact, generally within two to three months of administration. One state (Idaho) administered an online version of the survey.

Data collection

Pre-implementation data collection occurred during FY 2009, before the WIC food package changes. In FY 2010 and early FY 2011, the survey was re-administered, over an interval that occurred at least six months following the food package changes within each state**.** The second administration of the survey used the same instrument, with identical questions. Minor changes in page layout were made to facilitate scanning. Women and caregivers of infants and children who attended WIC clinics during the data collection periods completed the surveys. The collection schedules for individual WIC Programs are provided in Appendix A.

Data preparation and data files

Completed surveys were sorted and scanned with Opscan 8© scanners into the Scantools Plus© v.7.10200 software, and the data were converted to Excel and SPSS formats. Data from the first ("before" food package changes) and second ("after" food package changes) surveys were combined, with coding to denote the pre-or post-implementation data collection period. The data were cleaned to eliminate obviously incorrect responses such as implausible ages for adults or multiple responses to single-response items.

The final NATFAN data sets consists of Excel and SPSS files for the entire survey samples of women, infants, and children, with coding to denote "before" and "after" survey responses. Separate files also exist for each state, territory, and Indian Tribal Organization. The data files do not include respondent names or WIC Family Identification numbers. Individual survey responses are identified by a numerical code based on a number assigned when the paper surveys were printed, and these codes are not associated with a particular WIC program or geographic area.

Documentation and data file format

This data dictionary and codebook provides summary data for all the information in the results in the NATFAN data files. It aims to help readers understand the data file in terms of the questionnaire, but does not include analysis. The codebook includes information for each variable in the data file.

Figure 1 provides an example for one variable, which is an item concerning fruit juice consumption. As shown, the codebook entry for this item provides (1) the variable name, (2) the variable label, (3) the format associated with the variable, (4) the storage type, (5) the storage length in bytes for the variable, the (6) distribution of values by number and percent of total for the survey conducted *before* changes in the food package, (7) distribution of values by number and percent of total for the survey conducted *after* changes in the food package, (8) the value codes for the variable, and (9) the label associated with each code value.

Figure 1. Sample Codebook Listing

Question 1: ***How often do YOU drink 100% juice, such as orange, apple, or tomato?***

Variable Name (1)		Variable Label (2)		Format (3)	Type (4)	Length (5)
A1JUICE		Drink Juice		F8	Numeric	8
Before (6)		After (7)		Code (8)	Code Label (9)	
N	%	N	%			
1,907	7.5	2,429	8.8	0	Never or less than once per week	
6,789	26.6	7,911	28.5	1	1 to 3 times per week	
3,659	14.3	3,829	13.8	2	4 to 6 times per week	
3,428	13.4	3,664	13.2	3	1 time per day	
3,960	15.5	4,039	14.6	4	2 times per day	
2,561	10.0	2,418	8.7	5	3 times per day	
1,868	7.3	1,750	6.3	6	4 or more times per day	
1,392	5.4	1,686	6.1	999	Missing	

The codebook documents all records in the file. The records are raw, unweighted counts of the number of responses. For interval scaled variables such as "age" the mean, range, standard deviation, and the 25th, 50th, and 75th percentiles are reported. For questions in which there were options to make more than one selection (i.e. Q. 15, Q. 16 & Q. 26 in the Women questionnaire), we assigned a value code of 0 or 1, to denote the selection. Selected options were given a value code of 1; if a response was not selected, a value code of 0 was applied to that response. For these and similarly-worded items (i.e., a participant selected the response option, "I DO NOT eat fruit" but also selected one or more specific fruits), inconsistent answers were identified and have been labeled to denote the conflicting response using the code '-8'. For items 15, 16, and 26 (Women questionnaire), all sub-item responses were coded as missing if respondents did not select any of the possible responses. Missing and unreadable answers (i.e., respondents didn't bubble their answer clearly) were coded with "999."

Notes about the data

The data set includes responses in which the study participant may not have completed all questionnaire items. Questionnaire respondents included caregivers who may not have been WIC participants themselves, such as foster parents, fathers, and grandparents. Receipt of WIC foods in the last 30 days is an item with yes/no responses in the data set. For adults, reported ages younger than 10 have been coded as missing but no upper plausible limit was established. The variable "State" in the data file contains data from the individual State, Indian Tribal Organizations, and territorial WIC programs. Last, due to the differences in State WIC Program sampling strategies, some states (e.g., Texas and Utah) may be overrepresented and some states (e.g., California) may be underrepresented based on the program's share of National WIC participants compared to its representation in the NATFAN data set. Users of this data set should consider the use of statistical weighting techniques as appropriate.

The NATFAN surveys were developed and administered by the Institute for Obesity Research and Program Evaluation, Texas A&M University Department of Nutrition and Life Sciences and Texas Agrilife Research and Extension, under contracts with the Texas Department

of State Health Services WIC Program. The data in this report were prepared under a grant from the United States Department of Agriculture, Nutrition and Food Services Program

Chapter II. NATFAN Questionnaire Items Codebook for WOMEN Surveys

Variable Name		Variable Label		Format	Type	Length
ID		ID		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
Note: This item contains a unique number for each case (respondent) in the data set						

Variable Name		Variable Label		Format	Type	Length
SRVLANG		Survey language		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
20,419	79.9	21,961	79.2	1	English	
5,145	20.1	5,765	20.8	2	Spanish	

Variable Name		Variable Label		Format	Type	Length
Before or after		Before or after		F8	Numeric	8
N		%		Code	Code Label	
25,564		48.0		1	Before	
27,726		52.0		2	After	

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
280	1.1	310	1.1	1	Alabama	
207	0.8	148	0.5	2	Alaska	
428	1.7	441	1.6	3	Arizona	
477	1.9	554	2.0	4	Arkansas	

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
569	2.2	663	2.4	5	California	
572	2.2	660	2.4	6	Colorado	
474	1.9	920	3.3	7	Connecticut	
0	0.0	0	0.0	8	Delaware*	
736	2.9	836	3.0	9	Florida	
430	1.7	371	1.3	10	Georgia	
460	1.8	301	1.0	11	Hawaii	
1,717	6.7	1,175	4.2	12	Idaho	
450	1.8	503	1.8	13	Illinois	
498	1.9	477	1.7	14	Indiana	
643	2.5	638	2.3	15	Iowa	
508	2.0	706	2.5	16	Kansas	
306	1.2	824	3.0	17	Kentucky	
0	0.0	0	0.0	18	Louisiana*	
0	0.0	0	0.0	19	Maine*	
579	2.3	497	1.8	20	Maryland	
397	1.6	289	1.0	21	Massachusetts	
0	0.0	0	0.0	22	Michigan*	
0	0.0	0	0.0	23	Minnesota*	
376	1.5	177	0.6	24	Mississippi	
460	1.8	575	2.1	25	Missouri	
328	1.3	247	0.9	26	Montana	
641	2.5	498	1.8	27	Nebraska	
529	2.1	561	2.0	28	Nevada	
357	1.4	271	1.0	29	New Hampshire	
886	3.5	985	3.6	30	New Jersey	
618	2.4	485	1.7	31	New Mexico	
0	0.0	0	0.0	32	New York*	
549	2.1	465	1.7	33	North Carolina	
0	0.0	0	0.0	34	North Dakota*	

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
0	0.0	1,140	4.1	35	Ohio**	
0	0.0	0	0.0	36	Oklahoma*	
389	1.5	334	1.2	37	Oregon	
589	2.3	592	2.1	38	Pennsylvania	
0	0.0	15	0.1	39	Rhode Island**	
0	0.0	0	0.0	40	South Carolina*	
497	1.9	529	1.9	41	South Dakota	
544	2.1	629	2.3	42	Tennessee	
6,131	24.0	6,269	22.6	43	Texas	
0	0.0	0	0.0	44	Utah*	
208	0.8	204	0.7	45	Vermont	
339	1.3	816	2.9	46	Virginia	
377	1.5	372	1.3	47	Washington	
386	1.5	364	1.3	48	West Virginia	
415	1.6	431	1.6	49	Wisconsin	
299	1.2	261	0.9	50	Wyoming	
434	1.7	489	1.8	51	Washington DC	
149	0.6	88	0.3	52	Mariana Islands	
332	1.3	616	2.2	53	Indian Tribal Organizations	

Notes:

This variable "State" identifies individual states, Indian Tribal Organizations, and territories. ITO data have been consolidated.

* Indicates states that did not participate in the NATFAN study (no data for these states)

** Indicates states that participated only in the "After" NATFAN study surveys.

Variable Name		Variable Label		Format	Type	Length
Region		USDA region number		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,438	5.6	1,699	6.1	1	Northeast	
3,213	12.6	3,743	13.5	2	Mid-Atlantic	
3,221	12.6	3,618	13.0	3	Southeast	
1,363	5.3	2,551	9.2	4	Midwest	
7,392	28.9	7,736	27.9	5	Southwest	
4,001	15.7	4,187	15.1	6	Mountain Plains	
4,936	19.3	4,192	15.1	7	Western	

Question 1: ***How often do YOU drink 100% juice such as orange, apple, or tomato?***

Variable Name		Variable Label		Format	Type	Length
A1JUICE		Drink juice		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,907	7.5	2,429	8.8	0	Never or less than once per week	
6,789	26.6	7,911	28.5	1	1 to 3 times per week	
3,659	14.3	3,829	13.8	2	4 to 6 times per week	
3,428	13.4	3,664	13.2	3	1 time per day	
3,960	15.5	4,039	14.6	4	2 times per day	
2,561	10.0	2,418	8.7	5	3 times per day	
1,868	7.3	1,750	6.3	6	4 or more times per day	
1,392	5.4	1,686	6.1	999	Missing	

Question 2: ***How often do YOU drink soy milk?***						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A2SOY		Drink soy milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
21,187	82.9	22,805	82.3	0	Never or less than once per week	
929	3.6	962	3.5	1	1 to 3 times per week	
258	1.0	273	1.0	2	4 to 6 times per week	
456	1.8	527	1.9	3	1 time per day	
391	1.5	431	1.6	4	2 times per day	
221	0.9	209	0.8	5	3 times per day	
168	0.7	136	0.5	6	4 or more times per day	
1,954	7.6	2,383	8.6	999	Missing	

Question 3: ***How often do YOU drink artificially sweetened drinks such as diet cola, diet soda, or Crystal Light*****?**						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A3ART		Artificial drinks		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
11,866	46.4	12,739	45.9	0	Never or less than once per week	
5,835	22.8	6,312	22.8	1	1 to 3 times per week	
1,624	6.4	1,776	6.4	2	4 to 6 times per week	
2,093	8.2	2,211	8.0	3	1 time per day	
1,362	5.3	1,419	5.1	4	2 times per day	
639	2.5	652	2.4	5	3 times per day	
521	2.0	576	2.1	6	4 or more times per day	
1,624	6.4	2,041	7.4	999	Missing	

Question 4: *How often do YOU drink sugar sweetened drinks such as Kool Aid, soda, cola, sport drinks, or sugar sweetened tea?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A4SUGAR		Sugar sweetened		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
5,955	23.3	6,512	23.5	0	Never or less than once per week	
7,524	29.4	8,108	29.2	1	1 to 3 times per week	
2,857	11.2	3,142	11.3	2	4 to 6 times per week	
2,762	10.8	2,903	10.5	3	1 time per day	
2,165	8.5	2,349	8.5	4	2 times per day	
1,290	5.0	1,312	4.7	5	3 times per day	
1,319	5.2	1,391	5.0	6	4 or more times per day	
1,692	6.6	2,009	7.2	999	Missing	

Question 5: *How often do YOU eat fruit? This DOES NOT include juice.*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A5FRUIT		Eat fruit		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
886	3.5	752	2.7	0	Never or less than once per week	
5,300	20.7	4,679	16.9	1	1 to 3 times per week	
4,292	16.8	4,671	16.8	2	4 to 6 times per week	
4,182	16.4	4,371	15.8	3	1 time per day	
4,668	18.3	5,604	20.2	4	2 times per day	
2,540	9.9	3,117	11.2	5	3 times per day	
1,817	7.1	2,500	9.0	6	4 or more times per day	
1,879	7.4	2,032	7.3	999	Missing	

Question 6: *How often do YOU eat vegetables such as salad, carrots, or sweet potatoes? This DOES NOT include potatoes, French fries or potato chips.*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A6VEGE		Eat vegetables		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,166	4.6	1,121	4.0	0	Never or less than once per week	
5,622	22.0	5,600	20.2	1	1 to 3 times per week	
4,644	18.2	4,760	17.2	2	4 to 6 times per week	
4,820	18.9	5,158	18.6	3	1 time per day	
4,394	17.2	5,085	18.3	4	2 times per day	
2,049	8.0	2,418	8.7	5	3 times per day	
1,347	5.3	1,767	6.4	6	4 or more times per day	
1,522	6.0	1,817	6.6	999	Missing	

Question 7: *How often do YOU eat corn tortillas?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A7CT		Corn tortillas		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
9,931	38.8	11,376	41.0	0	Never or less than once per week	
7,121	27.9	7,333	26.4	1	1 to 3 times per week	
1,907	7.5	1,964	7.1	2	4 to 6 times per week	
1,685	6.6	1,795	6.5	3	1 time per day	
1,992	7.8	2,058	7.4	4	2 times per day	
952	3.7	975	3.5	5	3 times per day	
499	2.0	406	1.5	6	4 or more times per day	
1,477	5.8	1,819	6.6	999	Missing	

Question 8: ***How often do YOU eat whole-wheat tortillas?***

Variable Name	Variable Label	Format	Type	Length
A8WWT	Whole wheat tortillas	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
16,880	66.0	17,431	62.9	0	Never or less than once per week
4,226	16.5	5,249	18.9	1	1 to 3 times per week
817	3.2	907	3.3	2	4 to 6 times per week
888	3.5	1,193	4.3	3	1 time per day
409	1.6	472	1.7	4	2 times per day
194	0.8	210	0.8	5	3 times per day
144	0.6	130	0.5	6	4 or more times per day
2,006	7.8	2,134	7.7	999	Missing

Question 9: ***How often do YOU eat whole-wheat or whole-grain bread?***

Variable Name	Variable Label	Format	Type	Length
A9WWB	Whole wheat bread	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
5,461	21.4	4,169	15.0	0	Never or less than once per week
6,556	25.6	7,364	26.6	1	1 to 3 times per week
4,206	16.5	5,145	18.6	2	4 to 6 times per week
3,915	15.3	4,760	17.2	3	1 time per day
2,310	9.0	2,747	9.9	4	2 times per day
776	3.0	874	3.2	5	3 times per day
628	2.5	717	2.6	6	4 or more times per day
1,712	6.7	1,950	7.0	999	Missing

Question 10: *How often do YOU eat brown rice?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A10BR		Brown rice		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
15,574	60.9	16,123	58.2	0	Never or less than once per week	
5,093	19.9	6,191	22.3	1	1 to 3 times per week	
1,282	5.0	1,345	4.9	2	4 to 6 times per week	
1,066	4.2	1,184	4.3	3	1 time per day	
383	1.5	423	1.5	4	2 times per day	
168	0.7	141	0.5	5	3 times per day	
177	0.7	151	0.5	6	4 or more times per day	
1,821	7.1	2,168	7.8	999	Missing	

Question 11: *How often do YOU eat oatmeal?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A11OAT		Oatmeal		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
9,429	36.9	10,402	37.5	0	Never or less than once per week	
8,391	32.8	8,924	32.2	1	1 to 3 times per week	
2,518	9.8	2,530	9.1	2	4 to 6 times per week	
2,466	9.6	2,614	9.4	3	1 time per day	
613	2.4	594	2.1	4	2 times per day	
245	1.0	247	0.9	5	3 times per day	
300	1.2	329	1.2	6	4 or more times per day	
1,602	6.3	2,086	7.5	999	Missing	

Question 12: ***How often do YOU eat white bread?***

Variable Name	Variable Label	Format	Type	Length
A12WB	White bread	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
6,420	25.1	8,298	29.9	0	Never or less than once per week
7,175	28.1	7,618	27.5	1	1 to 3 times per week
4,046	15.8	3,915	14.1	2	4 to 6 times per week
3,173	12.4	2,923	10.5	3	1 time per day
1,713	6.7	1,579	5.7	4	2 times per day
703	2.7	606	2.2	5	3 times per day
771	3.0	722	2.6	6	4 or more times per day
1,563	6.1	2,065	7.4	999	Missing

Question 13: ***How often do YOU eat white flour tortillas?***

Variable Name	Variable Label	Format	Type	Length
A13WFT	White flour tortillas	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
11,208	43.8	13,223	47.7	0	Never or less than once per week
7,971	31.2	8,126	29.3	1	1 to 3 times per week
2,090	8.2	1,879	6.8	2	4 to 6 times per week
1,320	5.2	1,236	4.5	3	1 time per day
638	2.5	565	2.0	4	2 times per day
279	1.1	257	0.9	5	3 times per day
256	1.0	270	1.0	6	4 or more times per day
1,802	7.0	2,170	7.8	999	Missing

Question 14: ***How often do YOU eat white rice?***

Variable Name	Variable Label	Format	Type	Length
A14WR	White rice	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
6,921	27.1	7,963	28.7	0	Never or less than once per week
10,202	39.9	10,787	38.9	1	1 to 3 times per week
3,138	12.3	3,197	11.5	2	4 to 6 times per week
1,900	7.4	2,019	7.3	3	1 time per day
885	3.5	920	3.3	4	2 times per day
502	2.0	444	1.6	5	3 times per day
524	2.0	547	2.0	6	4 or more times per day
1,492	5.8	1,849	6.7	999	Missing

Question 15: ***During the past year, which fruits did YOU usually eat?***
I Do Not Eat Fruit

Variable Name	Variable Label	Format	Type	Length
A15NOFR	I do not eat fruit	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
24,354	95.3	26,164	94.4	0	Not Selected
77	0.3	61	0.2	1	Selected
103	0.4	35	0.1	-8	Selected this item and also selected fruit
1,030	4.0	1,466	5.3	999	Missing

Notes: If the response option 'I DO NOT eat fruit' was selected but one or more fruit items were marked, the value for the response to this option was coded as '-8.' All sub-item responses were coded as missing when respondents did not select any of the possible responses.

A15APPLE		Apples		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
2,786	10.9	3,129	11.3	0	Not selected	
21,748	85.1	23,131	83.4	1	Selected	
1,030	4.0	1,466	5.3	999	Missing	

A15APR1		Fresh apricots		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
22,167	86.7	23,614	85.2	0	Not selected	
2,367	9.3	2,646	9.5	1	Selected	
1,030	4.0	1,466	5.3	999	Missing	

A15APR2		Dried apricots		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
23,220	90.8	25,161	90.7	0	Not selected	
1,315	5.1	1,099	4.0	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15BAN		Bananas		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
2,795	10.9	3,372	12.2	0	Not selected	
21,740	85.0	22,888	82.6	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15BERR		Berries		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,743	65.5	16,828	60.7	0	Not selected	
7,792	30.5	9,432	34.0	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15MELON		Melons		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
9,726	38.0	9,984	36.0	0	Not selected	
14,809	57.9	16,276	58.7	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15CHERR		Cherries		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
15,320	59.9	15,363	55.4	0	Not selected	
9,215	36.0	10,897	39.3	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15DATE		Dates		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
23,811	93.1	25,627	92.4	0	Not selected	
724	2.8	633	2.3	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15FIGS		Figs		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
23,396	91.5	25,186	90.8	0	Not selected	
1,139	4.5	1,074	3.9	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15GRPFT		Grapefruit		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
18,082	70.7	20,194	72.8	0	Not selected	
6,453	25.2	6,066	21.9	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15GRAPE		Grapes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
3,738	14.6	3,900	14.1	0	Not selected	
20,797	81.4	22,360	80.6	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15KIWIS		Kiwis		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,673	65.2	17,645	63.6	0	Not selected	
7,862	30.8	8,615	31.1	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15LEMON		Lemon or limes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
14,591	57.1	15,919	57.4	0	Not selected	
9,944	38.9	10,341	37.3	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15MANG		Mangos		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
14,161	55.4	14,716	53.1	0	Not selected	
10,374	40.6	11,544	41.6	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15NECT		Nectarines		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
18,337	71.7	19,846	71.6	0	Not selected	
6,198	24.2	6,414	23.1	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15ORAN		Oranges		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
4,770	18.7	5,122	18.5	0	Not selected	
19,765	77.3	21,138	76.2	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15PAPA		Papayas		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
19,986	78.2	21,537	77.7	0	Not selected	
4,549	17.8	4,723	17.0	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15PEACH		Peaches		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
9,255	36.2	9,326	33.6	0	Not selected	
15,280	59.8	16,934	61.1	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15PEARS		Pears		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
12,440	48.7	14,109	50.9	0	Not selected	
12,095	47.3	12,151	43.8	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15PINE		Pineapple		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
8,943	35.0	9,390	33.9	0	Not selected	
15,592	61.0	16,870	60.8	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15PLUMS		Plums		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,958	66.3	17,688	63.8	0	Not selected	
7,577	29.6	8,572	30.9	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15PRUNE		Prunes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
22,136	86.6	23,977	86.5	0	Not selected	
2,399	9.4	2,283	8.2	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15RAISIN		Raisins		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
17,127	67.0	19,458	70.2	0	Not selected	
7,408	29.0	6,802	24.5	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15RHUB		Rhubarb		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
23,757	92.9	25,598	92.3	0	Not selected	
778	3.0	662	2.4	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15STRAW		Strawberries		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
4,835	18.9	4,377	15.8	0	Not selected	
19,700	77.1	21,883	78.9	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15TANG		Tangerines		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,681	65.3	18,899	68.2	0	Not selected	
7,854	30.7	7,361	26.5	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15WATER		Watermelon		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
6,776	26.5	6,000	21.6	0	Not selected	
17,759	69.5	20,260	73.1	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

A15OTHER		Other		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
24,048	94.1	25,702	92.7	0	Not selected	
487	1.9	558	2.0	1	Selected	
1,029	4.0	1,466	5.3	999	Missing	

Question 16: *During the past year, which vegetables did YOU usually eat?* I Do Not Eat Vegetables						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A16NOVEGE		I do not eat vegetables		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
24,344	95.2	26,092	94.1	0	Not selected	
92	0.4	109	0.4	1	Selected	
51	0.2	24	0.1	-8	Selected this item and also selected vegetable	
1,077	4.2	1,501	5.4	999	Missing	
Notes: If a participant selected the option 'I DO NOT eat vegetables' but also marked one or more vegetables, the value for the response to this option was coded as '-8.' All sub-item responses were coded as missing when respondents did not select any of the possible responses.						

A16ASPA		Asparagus		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
18,832	73.7	20,242	73.0	0	Not selected	
5,655	22.1	5,983	21.6	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16AVOC		Avocados		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
12,687	49.6	13,295	48.0	0	Not selected	
11,800	46.2	12,930	46.6	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16BEETS		Beets		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
21,873	85.6	23,459	84.6	0	Not selected	
2,614	10.2	2,766	10.0	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16BROCC		Broccoli		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
5,289	20.7	5,607	20.2	0	Not selected	
19,198	75.1	20,618	74.4	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16BRUSS		Brussels sprouts		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
21,797	85.3	23,399	84.4	0	Not selected	
2,690	10.5	2,826	10.2	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16CABB		Cabbage		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
11,456	44.8	12,713	45.9	0	Not selected	
13,031	51.0	13,512	48.7	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16CARR		Carrots		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
4,783	18.7	5,672	20.5	0	Not selected	
19,704	77.1	20,553	74.1	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16CAULI		Cauliflower		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
14,205	55.6	15,660	56.5	0	Not selected	
10,282	40.2	10,565	38.1	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16CHAY		Chayote		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
21,703	84.9	23,275	83.9	0	Not selected	
2,784	10.9	2,950	10.6	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16CORN		Corn		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
3,029	11.8	3,812	13.7	0	Not selected	
21,458	83.9	22,413	80.8	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16CUCU		Cucumber		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
8,070	31.6	8,104	29.2	0	Not selected	
16,417	64.2	18,121	65.4	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16EGGPL		Eggplant		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
22,124	86.5	23,778	85.8	0	Not selected	
2,363	9.2	2,447	8.8	1	Selected	
1,077	4.2	15,01	5.4	999	Missing	

A16GREEN		Greens		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
19,357	75.7	20,249	73.0	0	Not selected	
5,130	20.1	5,976	21.6	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16GBEAN		Green beans		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
7,364	28.8	8,108	29.2	0	Not selected	
17,123	67.0	18,117	65.3	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16GPEAS		Green peas		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
13,111	51.3	14,528	52.4	0	Not selected	
11,376	44.5	11,697	42.2	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16LETT		Lettuce		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
4,572	17.9	4,423	16.0	0	Not selected	
19,915	77.9	21,802	78.6	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16MUSH		Mushrooms		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
15,347	60.0	16,648	60.0	0	Not selected	
9,140	35.8	9,577	34.5	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16OKRA		Okra		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
20,312	79.5	21,772	78.5	0	Not selected	
4,175	16.3	4,453	16.1	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16ONION		Onions		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
8,203	32.1	8,805	31.8	0	Not selected	
16,284	63.7	17,420	62.8	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16PEPPER		Peppers		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
11,531	45.1	12,061	43.5	0	Not selected	
12,956	50.7	14,164	51.1	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16POTAT		Potatoes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
3,198	12.5	3,832	13.8	0	Not selected	
21,289	83.3	22,393	80.8	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16SPIN		Spinach		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
15,710	61.5	16,541	59.7	0	Not selected	
8,777	34.3	9,684	34.9	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16SSQUA		Squash		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,434	64.3	17,235	62.2	0	Not selected	
8,053	31.5	8,990	32.4	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16SWTPOT		Sweet potatoes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
15,735	61.6	17,059	61.5	0	Not selected	
8,752	34.2	9,166	33.1	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16TOMATO		Tomatoes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
5,701	22.3	5,752	20.7	0	Not selected	
18,786	73.5	20,473	73.8	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16TOMATI		Tomatillos		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
20,548	80.4	21,887	78.9	0	Not selected	
3,939	15.4	4,338	15.6	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16WSQUA		Winter squash		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
20,005	78.3	21,672	78.2	0	Not selected	
4,482	17.5	4,553	16.4	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

A16OTHER		Other		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
24,174	94.6	25,762	92.9	0	Not selected	
313	1.2	463	1.7	1	Selected	
1,077	4.2	1,501	5.4	999	Missing	

Question 17: ***How many cups of milk do YOU drink in a day? 1 cup = 8 oz***						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A17MILK		Cups of milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,118	4.4	1,154	4.2	0	I DO NOT drink milk	
2,862	11.2	3,479	12.5	1	Less than 1 cup	
6,018	23.5	6,553	23.6	2	1 cup	
7,739	30.3	8,256	29.8	3	2 cups	
4,283	16.8	4,286	15.5	4	3 cups	
2,156	8.4	2,134	7.7	5	4 or more cups	
1,388	5.4	1,864	6.7	999	Missing	

Question 18: ***What kind of milk do YOU drink most often?***

Variable Name	Variable Label	Format	Type	Length
A18KIND	Kind of milk	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
938	3.7	1,040	3.8	0	I DO NOT drink milk
20,860	81.6	22,243	80.2	1	Cow's milk
944	3.7	1,132	4.1	2	Lactaid or lactose free milk
489	1.9	506	1.8	3	Soy milk
41	0.2	37	0.1	4	Goat's milk
103	0.4	82	0.3	5	Rice milk
2,189	8.6	2,686	9.7	999	Missing

Question 19: ***What type of cow's milk do YOU usually drink?***

Variable Name	Variable Label	Format	Type	Length
A19TYPE	Type of cows milk	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
1,048	4.1	1,063	3.8	0	I DO NOT drink cow's milk
8,216	32.1	4,845	17.5	1	Whole milk
10,144	39.7	13,491	48.7	2	2% milk
2,051	8.0	3,222	11.6	3	1% milk
65	0.3	64	0.2	4	½ % milk
1,349	5.3	1,523	5.5	5	Skim (fat free) milk
241	0.9	177	0.6	6	I DO NOT know
2,450	9.6	3,341	12.1	999	Missing

Question 20: *I am willing to drink 2% milk.*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A20TWO		Willing to drink 2% milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
2,219	8.7	2,257	8.1	1	Strongly Disagree	
1,490	5.8	1,289	4.6	2	Disagree	
2,003	7.8	1,832	6.6	3	Neither	
8,080	31.6	9,246	33.3	4	Agree	
8,261	32.3	10,704	38.6	5	Strongly Agree	
3,511	13.7	2,398	8.6	999	Missing	

Question 21: *I am willing to drink 1% milk.*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A21ONE		1 percent milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
4,045	15.8	4,341	15.7	1	Strongly Disagree	
3,644	14.3	3,818	13.8	2	Disagree	
4,029	15.8	4,111	14.8	3	Neither	
6,489	25.4	7,852	28.3	4	Agree	
3,385	13.2	4,742	17.1	5	Strongly Agree	
3,972	15.5	2,862	10.3	999	Missing	

Question 22: ***I am willing to drink skim milk (fat free).***

Variable Name	Variable Label	Format	Type	Length
A22SKIM	Skim milk	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
7,098	27.8	8,059	29.1	1	Strongly Disagree
4,770	18.7	5,178	18.7	2	Disagree
3,653	14.3	3,876	14.0	3	Neither
3,679	14.4	4,446	16.0	4	Agree
2,475	9.7	3,360	12.1	5	Strongly Agree
3,889	15.2	2,807	10.1	999	Missing

Question 23: What is YOUR age?

Variable Name	Variable Label	Format	Type	Length
A23AGE	Women's age	F8	Numeric	8

Mean		Standard Deviation		Range		Percentile 25		Percentile 50		Percentile 75	
Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
25.1	25.5	6.8	6.6	82	83	20.0	21.0	24.0	24.0	29.0	30.0

Note: Reported ages younger than10 were coded as missing.

Question 25: ***What language is spoken MOST OFTEN at home?***

Variable Name	Variable Label	Format	Type	Length
A25LANG	Language spoken	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
15,599	61.0	16,642	60.0	1	English
3,337	13.1	3,707	13.4	2	Both Spanish and English
4,435	17.3	4,767	17.2	3	Spanish
359	1.4	351	1.3	4	other

Question 25: ***What language is spoken MOST OFTEN at home?***

Variable Name	Variable Label	Format	Type	Length
A25LANG	Language spoken	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
1,834	7.2	2,259	8.1	999	Missing

Question 26: ***What is YOUR race?***

Variable Name	Variable Label	Format	Type	Length
A26WNH	White, non-Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
13,815	54.0	15,306	55.2	0	Not selected
9,521	37.2	9,776	35.3	1	Selected
2,228	8.7	2,644	9.5	999	Missing

Note. All sub-item responses were coded as missing when respondents did not select any of the possible responses.

A26WH	White, Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
16,414	64.2	17,212	62.1	0	Not selected
6,922	27.1	7,870	28.4	1	Selected
2,228	8.7	2,644	9.5	999	Missing

A26BNH		Black, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
20,065	78.5	21,031	75.9	0	Not selected	
3,271	12.8	4,051	14.6	1	Selected	
2,228	8.7	2,644	9.5	999	Missing	

A26BH		Black, Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
22,815	89.2	24,489	88.3	0	Not selected	
521	2.0	593	2.1	1	Selected	
2,228	8.7	2,644	9.5	999	Missing	

A26NANH		Native American, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
22,543	88.2	24,266	87.5	0	Not selected	
793	3.1	816	2.9	1	Selected	
2,228	8.7	2,644	9.5	999	Missing	

A26NAH		Native American, Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
22,521	88.1	24,472	88.3	0	Not selected	
815	3.2	610	2.2	1	Selected	
2,228	8.7	2,644	9.5	999	Missing	

A26PINH		Pacific Islander, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
23,027	90.1	24,888	89.8	0	Not selected	
309	1.2	194	0.7	1	Selected	
2,228	8.7	2,644	9.5	999	Missing	

A26PIH		Pacific Islander, Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
22,891	89.5	24,986	90.1	0	Not selected	
446	1.7	96	0.3	1	Selected	
2,227	8.7	2,644	9.5	999	Missing	

A26ANH		Asian, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
23,073	90.3	24,620	88.8	0	Not selected	
264	1.0	462	1.7	1	Selected	
2,227	8.7	2,644	9.5	999	Missing	

A26AH		Asian, Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
22,971	89.9	24,978	90.1	0	Not selected	
366	1.4	104	0.4	1	Selected	
2,227	8.7	2,644	9.5	999	Missing	

A26OTHER		Other		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
22,221	86.9	24,108	87.0	0	Not selected	
1,116	4.4	974	3.5	1	Selected	
2,227	8.7	2,644	9.5	999	Missing	

A26REFU		Do not want to answer		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
22,838	89.3	24,590	88.7	0	Not selected	
499	2.0	492	1.8	1	Selected	
2,227	8.7	2,644	9.5	999	Missing	

Question 27: ***What is the highest level of education YOU have completed?***

Variable Name	Variable Label	Format	Type	Length
A27EDUC	Highest level of education	F8	Numeric	8

Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
1,043	4.1	1,157	4.2	1	1st to 6th grade
2,062	8.1	2,033	7.3	2	7th to 9th grade
4,470	17.5	4,654	16.8	3	10th to 12th grade
6,064	23.7	6,587	23.8	4	High School graduate
1,565	6.1	1,505	5.4	5	GED
5,278	20.6	5,856	21.1	6	Some college
1,685	6.6	1,974	7.1	7	Associates degree or Technical College degree
1,370	5.4	1,466	5.3	8	Bachelor's degree or higher
2,027	7.9	2,494	9.0	999	Missing

Question 28: *Did YOU receive WIC foods for yourself in the past 30 days?*					
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A28WIC		Women receive WIC		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
5,945	23.3	6,264	22.6	0	No
15,431	60.4	18,219	65.7	1	Yes
4,188	16.4	3,243	11.7	999	Missing

Question 29: *Are YOU currently pregnant?*					
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A29PREG		Currently pregnant		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
14,279	55.9	14,791	53.3	0	No
9,566	37.4	10,813	39.0	1	Yes
309	1.2	248	0.9	2	I DO NOT know
1,410	5.5	1,874	6.8	999	Missing

Question 30: *Have YOU had a baby within the last 6 months?*					
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A30BABY		Had baby within last six months		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
14,000	54.8	16,500	59.5	0	No
8,320	32.5	9,203	33.2	1	Yes
3,244	12.7	2,023	7.3	999	Missing

Question 31: ***Are YOU currently breastfeeding?***						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
A31BF		Currently breastfeeding		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
18,288	71.5	21,082	76.0	0	No	
4,084	16.0	4,617	16.7	1	Yes	
3,192	12.5	2,027	7.3	999	Missing	

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Variable Name		Variable Label		Format	Type	Length
ID		ID		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
Note. This item contains a unique number for each case (respondent) in the data set						

Variable Name		Variable Label		Format	Type	Length
SRVLANG		Survey language		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
17,892	82.2	18,838	82.1	1	English	
3,876	17.8	4,113	17.9	2	Spanish	

Variable Name		Variable Label		Format	Type	Length
Before or after		Before or after		F8	Numeric	8
N		**%**		**Code**	**Code Label**	
21,768		48.7		1	Before	
22,951		51.3		2	After	

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
234	1.1	342	1.5	1	Alabama	
161	0.7	127	0.6	2	Alaska	

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
411	1.9	452	2.0	3	Arizona	
472	2.2	547	2.4	4	Arkansas	
540	2.5	616	2.7	5	California	
565	2.6	639	2.8	6	Colorado	
466	2.1	910	4.0	7	Connecticut	
0	0.0	0	0.0	8	Delaware*	
784	3.6	864	3.8	9	Florida	
421	1.9	374	1.6	10	Georgia	
467	2.1	288	1.3	11	Hawaii	
927	4.3	586	2.6	12	Idaho	
444	2.0	487	2.1	13	Illinois	
476	2.2	515	2.2	14	Indiana	
645	3.0	673	2.9	15	Iowa	
484	2.2	775	3.4	16	Kansas	
306	1.4	477	2.1	17	Kentucky	
0	0.0	0	0.0	18	Louisiana*	
0	0.0	0	0.0	19	Maine*	
555	2.5	554	2.4	20	Maryland	
423	1.9	279	1.2	21	Massachusetts	
0	0.0	0	0.0	22	Michigan*	
0	0.0	0	0.0	23	Minnesota*	
394	1.8	193	0.8	24	Mississippi	
499	2.3	575	2.5	25	Missouri	
348	1.6	198	0.9	26	Montana	
689	3.2	515	2.2	27	Nebraska	
532	2.4	559	2.4	28	Nevada	

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
367	1.7	294	1.3	29	New Hampshire	
965	4.4	1,068	4.7	30	New Jersey	
725	3.3	591	2.6	31	New Mexico	
0	0.0	0	0.0	32	New York*	
529	2.4	473	2.1	33	North Carolina	
0	0.0	0	0.0	34	North Dakota*	
0	0	651	2.8	35	Ohio**	
0	0.0	0	0.0	36	Oklahoma*	
386	1.8	333	1.5	37	Oregon	
603	2.8	578	2.5	38	Pennsylvania	
0	0.0	23	0.1	39	Rhode Island**	
0	0.0	0	0.0	40	South Carolina*	
464	2.1	475	2.1	41	South Dakota	
547	2.5	665	2.9	42	Tennessee	
3,084	14.2	2,658	11.6	43	Texas	
0	0.0	0	0.0	44	Utah*	
164	0.8	168	0.7	45	Vermont	
369	1.7	824	3.6	46	Virginia	
349	1.6	314	1.4	47	Washington	
293	1.3	413	1.8	48	West Virginia	
380	1.7	424	1.8	49	Wisconsin	
284	1.3	302	1.3	50	Wyoming	
462	2.1	518	2.3	51	Washington DC	
150	0.7	67	0.3	52	Mariana Islands	
404	1.9	567	2.5	53	Indian Tribal Organizations	
Notes:						

Variable Name	Variable Label	Format	Type	Length
State	Individual state	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label

This variable "State" identifies individual states, Indian Tribal Organizations (ITO), and territories. ITO data have been consolidated.

* Indicates states that did not participate in the NATFAN study (no data for these states)

** Indicates states that participated only in the "After" NATFAN study surveys.

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Variable Name	Variable Label	Format	Type	Length
Region	USDA region number	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
1,428	6.6	1,674	7.3	1	Northeast
3,247	14.9	3,955	17.3	2	Mid-Atlantic
3,215	14.8	3,393	14.8	3	Southeast
1,300	6.0	2,077	9.1	4	Midwest
4,510	20.7	4,130	18.0	5	Southwest
4,030	18.5	4,215	18.4	6	Mountain Plains
4,038	18.6	3,443	15.0	7	Western

Question 32: ***Is YOUR INFANT currently breastfed or given breast milk?***

Variable Name	Variable Label	Format	Type	Length
I32BFNO	Infant currently receives breast milk	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
14,325	65.8	15,306	66.7	0	No
6,087	28.0	6,073	26.5	1	Yes
1,356	6.2	1,572	6.8	999	Missing

Question 33: ***Was YOUR INFANT ever breastfed at least one time?***

Variable Name	Variable Label	Format	Type	Length
I33BFEV	Infant was ever breastfed	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
6,108	28.1	6,404	27.9	0	No
13,919	63.9	14,576	63.5	1	Yes
229	1.1	198	0.9	2	Don’t know/not sure
1,512	6.9	1,773	7.7	999	Missing

Question 34: ***What was the age of YOUR INFANT when you STOPPED breastfeeding?***

Variable Name	Variable Label	Format	Type	Length
I34STOP	Age stopped breastfeeding	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
4,784	22.0	5,167	22.5	1	Less than 1 month
2,940	13.5	3,129	13.6	2	1 to 2 months
1,871	8.6	2,149	9.4	3	3 to 4 months
786	3.6	900	3.9	4	5 to 6 months
357	1.6	384	1.7	5	7 to 8 months
189	0.9	218	0.9	6	9 to 10 months
187	0.9	123	0.5	7	11 months
4,891	22.5	4,648	20.3	8	Still breastfeeding
5,763	26.5	6,233	27.2	999	Missing

Question 35: ***How many ounces of formula does YOUR INFANT drink per feeding?***

Variable Name	Variable Label	Format	Type	Length
I35OUNC	Ounces of formula	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
1,714	7.9	2,529	11.0	0	MY INFANT DOES NOT drink formula
96	.4	104	.5	1	1 ounce
1,006	4.6	1,029	4.5	2	2 ounces
1,292	5.9	1,318	5.7	3	3 ounces
3,506	16.1	3,438	15.0	4	4 ounces
1,924	8.8	1,842	8.0	5	5 ounces
4,558	20.9	4,760	20.7	6	6 ounces
1,240	5.7	1,369	6.0	7	7 ounces

Question 35: *How many ounces of formula does YOUR INFANT drink per feeding?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I35OUNC	Ounces of formula		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
3,406	15.6	3,625	15.8	8	8 ounces
313	1.4	325	1.4	9	9 ounces
108	.5	154	.7	10	10 ounces
10	.0	8	.0	11	11 ounces
58	.3	52	.2	12	12 ounces
3	.0	3	.0	13	13 ounces
13	.1	14	.1	14	14 ounces
8	.0	11	.0	15	15 ounces
66	.3	60	.3	16	16 ounces
2,447	11.2	2,310	10.1	999	Missing

Question 36: *How often does YOUR INFANT drink formula?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I36FREQ	Frequency of drinking formula		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
1,626	7.5	2,357	10.3	0	Never or less than once per week
174	0.8	204	0.9	1	1 to 2 times per week
584	2.7	605	2.6	2	3 to 4 times per week
480	2.2	506	2.2	3	5 to 6 times per week
158	0.7	241	1.1	4	1 time per day
2,021	9.3	2,189	9.5	5	2 to 3 times per day
5,741	26.4	6,001	26.1	6	4 or 5 times per day
4,892	22.5	4,916	21.4	7	6 to 7 times per day
2,294	10.5	2,549	11.1	8	8 to 9 times per day
715	3.3	752	3.3	9	10 to 11 times per day

Question 36: ***How often does YOUR INFANT drink formula?***

Variable Name	Variable Label	Format	Type	Length
I36FREQ	Frequency of drinking formula	F8	Numeric	8

Before		After			
N	**%**	**N**	**%**	**Code**	**Code Label**
313	1.4	371	1.6	10	12 to 13 times per day
161	0.7	187	0.8	11	14 or more times per day
2,609	12.0	2,073	9.0	999	Missing

Question 37: ***When you run out of WIC formula, what do YOU usually do?***

Variable Name	Variable Label	Format	Type	Length
I37OUT	Formula running out	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
4,300	19.8	4,055	17.7	0	Formula DOES NOT usually run out
11,212	51.5	12,078	52.6	1	I buy or am give additional formula
91	0.4	104	0.5	2	I add extra milk to the formula
521	2.4	511	2.2	3	I add cereal to the formula
149	0.7	162	0.7	4	I add extra water to the formula
721	3.3	654	2.8	5	I try to give more breast milk
770	3.5	658	2.9	6	I breastfeed my infant
1,750	8.0	2,297	10.0	7	MY INFANT DOES NOT drink formula
2,254	10.4	2,432	10.6	999	Missing

Question 38: ***What kinds of baby food do you feed YOUR INFANT?***
I DO NOT feed MY INFANT jars/containers of baby food

Variable Name	Variable Label	Format	Type	Length
I38NONE	No jars/containers of baby food	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
12,114	55.7	12,754	55.6	0	Not Selected
7,674	35.3	7,825	34.1	1	Selected
1,980	9.1	2,372	10.3	999	Missing

Note. For item 38, all sub-item responses were coded as missing when respondents did not select any of the possible responses.

I38FRUIT	Fruits	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
9,807	45.1	9,204	40.1	0	Not selected
9,981	45.9	11,375	49.6	1	Selected
1,980	9.1	2,372	10.3	999	Missing

I38VEGE	Vegetables	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
10,282	47.2	9,758	42.5	0	Not selected
9,506	43.7	10,821	47.1	1	Selected
1,980	9.1	2,372	10.3	999	Missing

I38CERE		Cereal		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
9,620	44.2	10,169	44.3	0	Not selected	
10,168	46.7	10,410	45.4	1	Selected	
1,980	9.1	2,372	10.3	999	Missing	

I38MEAT		Meats		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
15,950	73.3	16,455	71.7	0	Not selected	
3,838	17.6	4,124	18.0	1	Selected	
1,980	9.1	2,372	10.3	999	Missing	

I38DINN		Dinners		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
15,793	72.6	16,990	74.0	0	Not selected	
3,995	18.4	3,589	15.6	1	Selected	
1,980	9.1	2,372	10.3	999	Missing	

I38DESS		Dessert		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,723	76.8	18,004	78.4	0	Not selected	
3,065	14.1	2,575	11.2	1	Selected	
1,980	9.1	2,372	10.3	999	Missing	

I38OTHER		Others		F8	Numeric	8
Before		**After**		**Code**	**Code Label**	
N	**%**	**N**	**%**			
18,921	86.9	19,724	85.9	0	Not selected	
867	4.0	855	3.7	1	Selected	
1,980	9.1	2,372	10.3	999	Missing	

Question 39: ***How many jars/containers of baby food do you feed YOUR INFANT in an average week?***

Variable Name	Variable Label	Format	Type	Length
I39JARS	Quantity of baby food jars	F8	Numeric	8

Mean		Standard Deviation		Range		Percentile 25		Percentile 50		Percentile 75	
Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
7.03	8.7	10.1	11.1	99	99	0.0	0.0	4.0	6.0	10.0	14.0

Question 40*: How often does YOUR INFANT drink milk other than breast milk or formula?*

Variable Name		Variable Label		Format	Type	Length
I40MILK		Drinking milk		F8	Numeric	8
Before		**After**		**Code**	**Code Label**	
N	**%**	**N**	**%**			
16,214	74.5	16,903	73.6	0	Never or less than once per week	
587	2.7	573	2.5	1	1 to 3 times per week	
306	1.4	303	1.3	2	4 to 6 times per week	
209	1.0	220	1.0	3	1 time per day	
249	1.1	267	1.2	4	2 times per day	
374	1.7	414	1.8	5	3 times per day	

Question 40: *How often does YOUR INFANT drink milk other than breast milk or formula?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I40MILK		Drinking milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,581	7.3	1,733	7.6	6	4 or more times per day	
2,248	10.3	2,538	11.1	999	Missing	

Question 41: *How often does YOUR INFANT drink soy milk?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I41SOY		Drinking soy milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
18,212	83.7	19,188	83.6	0	Never or less than once per week	
111	0.5	105	0.5	1	1 to 3 times per week	
81	0.4	70	0.3	2	4 to 6 times per week	
51	0.2	27	0.1	3	1 time per day	
47	0.2	42	0.2	4	2 times per day	
83	0.4	78	0.3	5	3 times per day	
677	3.1	628	2.7	6	4 or more times per day	
2,506	11.5	2,813	12.3	999	Missing	

Question 42: ***How often does YOUR INFANT drink 100% juice such as apple, orange, or tomato?***

Variable Name	Variable Label	Format	Type	Length
I42JUI	Drinking juice	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
11,056	50.8	12,260	53.4	0	Never or less than once per week
3,541	16.3	3,681	16.0	1	1 to 3 times per week
1,285	5.9	1,172	5.1	2	4 to 6 times per week
1,780	8.2	1,633	7.1	3	1 time per day
1,263	5.8	1,152	5.0	4	2 times per day
438	2.0	413	1.8	5	3 times per day
205	0.9	188	0.8	6	4 or more times per day
2,200	10.1	2,452	10.7	999	Missing

Question 43: *How often does YOUR INFANT drink other drinks such as Kool-Aid, sugar water, soda, cola, sports drinks, or sweet tea?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I43SUG		Drinking other drinks		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
17,910	82.3	18,768	81.8	0	Never or less than once per week	
781	3.6	828	3.6	1	1 to 3 times per week	
127	0.6	140	0.6	2	4 to 6 times per week	
271	1.2	288	1.3	3	1 time per day	
139	0.6	138	0.6	4	2 times per day	
56	0.3	60	0.3	5	3 times per day	
47	0.2	37	0.2	6	4 or more times per day	
2,437	11.2	2,692	11.7	999	Missing	

Question 44: *How often does YOUR INFANT eat cereal?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I44CER		Eating cereal		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
8,326	38.2	8,863	38.6	0	Never or less than once per week	
2,564	11.8	2,770	12.1	1	1 to 3 times per week	
1,828	8.4	1,796	7.8	2	4 to 6 times per week	
3,296	15.1	3,476	15.1	3	1 time per day	
2,200	10.1	2,138	9.3	4	2 times per day	
692	3.2	759	3.3	5	3 times per day	
613	2.8	681	3.0	6	4 or more times per day	
2,249	10.3	2,468	10.8	999	Missing	

Question 45: *How often does YOUR INFANT eat fruits?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I45FRUIT	Eating fruits		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
9141	42.0	9250	40.3	0	Never or less than once per week
2181	10.0	2063	9.0	1	1 to 3 times per week
1691	7.8	1620	7.1	2	4 to 6 times per week
2776	12.8	2775	12.1	3	1 time per day
2539	11.7	3127	13.6	4	2 times per day
825	3.8	1182	5.2	5	3 times per day
339	1.6	476	2.1	6	4 or more times per day
2276	10.5	2458	10.7	999	Missing

Question 46: *How often does YOUR INFANT eat vegetables?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I46VEGE	Eating vegetables		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
9,409	43.2	9,441	41.1	0	Never or less than once per week
1,982	9.1	1,927	8.4	1	1 to 3 times per week
1,714	7.9	1,606	7.0	2	4 to 6 times per week
2,871	13.2	2,843	12.4	3	1 time per day
2,480	11.4	3,108	13.5	4	2 times per day
735	3.4	1,055	4.6	5	3 times per day
312	1.4	450	2.0	6	4 or more times per day
2,265	10.4	2,521	11.0	999	Missing

Question 47: *How often does YOUR INFANT eat meat?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I47MEAT	Eating meat		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
13,640	62.7	14,274	62.2	0	Never or less than once per week
1,712	7.9	1,686	7.3	1	1 to 3 times per week
808	3.7	734	3.2	2	4 to 6 times per week
1,809	8.3	1,962	8.5	3	1 time per day
903	4.1	943	4.1	4	2 times per day
226	1.0	295	1.3	5	3 times per day
127	0.6	168	0.7	6	4 or more times per day
2,543	11.7	2,889	12.6	999	Missing

Question 48: *How often does YOUR INFANT eat desserts?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I48DESS	Eating desserts		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
14,436	66.3	15,570	67.8	0	Never or less than once per week
2,094	9.6	2,052	8.9	1	1 to 3 times per week
683	3.1	545	2.4	2	4 to 6 times per week
1,331	6.1	1,165	5.1	3	1 time per day
465	2.1	448	2.0	4	2 times per day
145	0.7	172	0.7	5	3 times per day
111	0.5	119	0.5	6	4 or more times per day
2,503	11.5	2,880	12.5	999	Missing

Question 49: *Please choose the age at which cereal were first fed to YOUR INFANT?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I49AGECER	Cereal first fed to infant		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
7,245	33.3	7,721	33.6	0	My infant does not eat this
3,711	17.0	3,633	15.8	1	Less than 4 months old
6,022	27.7	6,004	26.2	2	4 to 5 months old
1,918	8.8	2,473	10.8	3	6 months old
383	1.8	422	1.8	4	7 to 8 months old
170	0.8	201	0.9	5	9 to 11 months old
2,319	10.7	2,497	10.9	999	Missing

Question 50: *Please choose the age at which vegetables were first fed to YOUR INFANT?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I50AGEVEG	Vegetables first fed		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
8,510	39.1	8,663	37.7	0	My infant does not eat this
1,091	5.0	1,040	4.5	1	Less than 4 months old
5,230	24.0	5,553	24.2	2	4 to 5 months old
3,459	15.9	4,100	17.9	3	6 months old
902	4.1	801	3.5	4	7 to 8 months old
222	1.0	222	1.0	5	9 to 11 months old
2,354	10.8	2,572	11.2	999	Missing

Question 51: *Please choose the age at which fruits were first fed to YOUR INFANT?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I51AGEFRU		Fruit first fed		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
8,299	38.1	8,481	37.0	0	My infant does not eat this	
1,286	5.9	1,273	5.5	1	Less than 4 months old	
5,161	23.7	5,570	24.3	2	4 to 5 months old	
3,368	15.5	3,972	17.3	3	6 months old	
960	4.4	818	3.6	4	7 to 8 months old	
255	1.2	232	1.0	5	9 to 11 months old	
2,439	11.2	2,605	11.4	999	Missing	

Question 52: *Please choose the age at which meats were first fed to YOUR INFANT?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I52AGEMEA	Meat first fed		F8	Numeric	8
Before		**After**		**Code**	**Code Label**
N	**%**	**N**	**%**		
12,576	57.8	13,205	57.5	0	My infant does not eat this
247	1.1	245	1.1	1	Less than 4 months old
1,094	5.0	1,157	5.0	2	4 to 5 months old
2,162	9.9	2,311	10.1	3	6 months old
1,966	9.0	1,935	8.4	4	7 to 8 months old
942	4.3	983	4.3	5	9 to 11 months old
2,781	12.8	3,115	13.6	999	Missing

Question 53: *Please choose the age at which desserts were first fed to YOUR INFANT?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
I53AGEDES	Desserts first fed		F8	Numeric	8
Before		**After**		**Code**	**Code Label**
N	**%**	**N**	**%**		
13,017	59.8	14,134	61.6	0	My infant does not eat this
441	2.0	407	1.8	1	Less than 4 months old
1,477	6.8	1,236	5.4	2	4 to 5 months old
1,805	8.3	1,744	7.6	3	6 months old
1,293	5.9	1,271	5.5	4	7 to 8 months old
754	3.5	813	3.5	5	9 to 11 months old
2,981	13.7	3,346	14.6	999	Missing

Question 54: ***Please choose the age at which 100% juice such as apple, orange or tomato were first fed to YOUR INFANT?***

Variable Name	Variable Label	Format	Type	Length
I54AGEJUC	Juice first fed	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
9,856	45.3	10,964	47.8	0	My infant does not eat this
1,480	6.8	1,352	5.9	1	Less than 4 months old
3,022	13.9	2,809	12.2	2	4 to 5 months old
3,038	14.0	2,930	12.8	3	6 months old
1,311	6.0	1,378	6.0	4	7 to 8 months old
446	2.0	593	2.6	5	9 to 11 months old
2,615	12.0	2,925	12.7	999	Missing

Question 55: ***Please choose the age at which formula were first fed to YOUR INFANT?***

Variable Name	Variable Label	Format	Type	Length
I55AGEFOR	Formula first fed	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
3,227	14.8	3,616	15.8	0	My infant does not eat this
14,212	65.3	14,662	63.9	1	Less than 4 months old
727	3.3	808	3.5	2	4 to 5 months old
318	1.5	330	1.4	3	6 months old
245	1.1	225	1.0	4	7 to 8 months old
360	1.7	329	1.4	5	9 to 11 months old
2,679	12.3	2,981	13.0	999	Missing

Question 56: ***Please choose the age at which regular milk were first fed to YOUR INFANT?***

Variable Name	Variable Label	Format	Type	Length
I56AGEMIL	Milk first fed	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
16,897	77.6	17,605	76.7	0	My infant does not eat this
259	1.2	239	1.0	1	Less than 4 months old
127	0.6	118	0.5	2	4 to 5 months old
169	0.8	175	0.8	3	6 months old
279	1.3	287	1.3	4	7 to 8 months old
1,165	5.4	1,328	5.8	5	9 to 11 months old
2,872	13.2	3,199	13.9	999	Missing

Question 57*: Please choose the age at which other drinks such as Kool-Aid, soda, cola, sports drinks, tea, sugar-water, or diet drinks were first fed to YOUR INFANT?*

Variable Name	Variable Label	Format	Type	Length
I57AGEOTH	Other drinks first fed	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
17,382	79.9	18,148	79.1	0	My infant does not eat this
231	1.1	228	1.0	1	Less than 4 months old
211	1.0	221	1.0	2	4 to 5 months old
285	1.3	327	1.4	3	6 months old
405	1.9	405	1.8	4	7 to 8 months old
654	3.0	663	2.9	5	9 to 11 months old
2,600	11.9	2,959	12.9	999	Missing

Question 58: ***Do you have an INFANT (younger than 12 months) in your household who receives WIC foods or formula?***

Variable Name	Variable Label	Format	Type	Length
I58WIC	Infant that receives WIC	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
3,928	18.0	4,345	18.9	0	No
15,995	73.5	16,565	72.2	1	Yes
1,845	8.5	2,041	8.9	999	Missing

Question 59: ***If YES, did YOUR INFANT receive WIC foods or formula in the past 30 days?***

Variable Name	Variable Label	Format	Type	Length
I59	Infant received WIC in the past 30 days	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
3,306	15.2	4,038	17.6	0	No
14,486	66.5	14,844	64.7	1	Yes
3,976	18.3	4,069	17.7	999	Missing

Question 60: ***Are YOU the PRIMARY CAREGIVER for this INFANT?***

Variable Name	Variable Label	Format	Type	Length
I60CARE	Primary caregiver of infant	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
488	2.2	525	2.3	0	No
18,648	85.7	20,302	88.5	1	Yes
2,632	12.1	2,124	9.3	999	Missing

Question 61: ***Is this INFANT a:***					
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I61SEX		Sex of infant		F8	Numeric	8
Before		**After**		**Code**	**Code Label**
N	**%**	**N**	**%**		
10,090	46.4	10,577	46.1	1	Boy
9,996	45.9	10,301	44.9	2	Girl
1,682	7.7	2,073	9.0	999	Missing

Question 62: ***How old is YOUR INFANT?***					
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I62AGE		Age of infant		F8	Numeric	8
Before		**After**		**Code**	**Code Label**
N	**%**	**N**	**%**		
2,357	10.8	2,416	10.5	1	Less than 1 month old
2,907	13.4	2,947	12.8	2	1 to 2 months old
3,642	16.7	3,623	15.8	3	3 to 4 months old
1,439	6.6	1,585	6.9	4	5 months old
2,317	10.6	2,524	11.0	5	6 months old
2,858	13.1	2,944	12.8	6	7 to 8 months old
3,162	14.5	3,361	14.6	7	9 to 10 months old
1,170	5.4	1,360	5.9	8	11 months old
1,916	8.8	2,191	9.5	999	Missing

Question 63: What is YOUR age?

Variable Name	Variable Label	Format	Type	Length
I63	Age of caregiver	F8	Numeric	8

Mean		Standard Deviation		Range		Percentile 25		Percentile 50		Percentile 75	
Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
25.3	25.7	6.7	6.7	82	83	21.0	21.0	24.0	24.0	29.0	29.0

Note: Reported ages younger than10 were coded as missing.

Question 65: ***What language is spoken MOST OFTEN at home?***

Variable Name	Variable Label	Format	Type	Length
I65LANG	Language spoken	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
13,700	62.9	14,256	62.1	1	English
2,551	11.7	2,719	11.8	2	Both Spanish and English
3,272	15.0	3,374	14.7	3	Spanish
345	1.6	313	1.4	4	other
1,900	8.7	2,289	10.0	999	Missing

Question 66: *What is YOUR race?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I66WNH		White, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
11,498	52.8	12,057	52.5	0	Not selected	
8,089	37.2	8,455	36.8	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	
Note. All sub-item responses were coded as missing when respondents did not select any of the possible responses.						

I66WH		White, Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
14,451	66.4	15,040	65.5	0	Not selected	
5,136	23.6	5,472	23.8	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66BNH		Black, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
16,434	75.5	16,844	73.4	0	Not selected	
3,153	14.5	3,668	16.0	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66BH		Black, Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
19,118	87.8	20,021	87.2	0	Not selected	
469	2.2	491	2.1	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66NANH		Native American, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
18,893	86.8	19,806	86.3	0	Not selected	
694	3.2	706	3.1	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66NAH		Native American, Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
19,094	87.7	20,044	87.3	0	Not selected	
493	2.3	468	2.0	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66PINH		Pacific Islander, non-Hispanic		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
19,319	88.7	20,325	88.6	0	Not selected	
268	1.2	187	0.8	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66PIH		Pacific Islander, Hispanic		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
19,457	89.4	20,423	89.0	0	Not selected	
130	0.6	89	0.4	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66ANH		Asian, non-Hispanic		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
19,093	87.7	20,097	87.6	0	Not selected	
494	2.3	415	1.8	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66AH		Asian, Hispanic		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
19,478	89.5	20,413	88.9	0	Not selected	
109	0.5	99	0.4	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66OTHER		Other		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
18,711	86.0	19,713	85.9	0	Not selected	
876	4.0	799	3.5	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

I66REFU		Do not want to answer		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
19,036	87.4	19,981	87.1	0	Not selected	
551	2.5	531	2.3	1	Selected	
2,181	10.0	2,439	10.6	999	Missing	

Question 67: ***What is the highest level of education YOU have completed?***						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
I67EDUC		Highest level of education		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
737	3.4	772	3.4	1	1st to 6th grade	
1,489	6.8	1,359	5.9	2	7th to 9th grade	
3,626	16.7	3,605	15.7	3	10th to 12th grade	
5,026	23.1	5,477	23.9	4	High School graduate	
1,423	6.5	1,373	6.0	5	GED	
4,688	21.5	4,997	21.8	6	Some college	
1,443	6.6	1,683	7.3	7	Associates degree or Technical College degree	
1,118	5.1	1,214	5.3	8	Bachelor's degree or higher	
2,218	10.2	2,471	10.8	999	Missing	

Chapter IV. NATFAN Questionnaire Items Codebook for CHILDREN Surveys

Variable Name	Variable Label	Format	Type	Length
ID	ID	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label

Note: This item contains a unique number for each case (respondent) in the data set

Variable Name	Variable Label	Format	Type	Length
SRVLANG	Survey language	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
31,867	78.9	33,727	78.7	1	English
8,537	21.1	9,129	21.3	2	Spanish

Variable Name	Variable Label	Format	Type	Length
Before or after	Before or after	F8	Numeric	8

N	%	Code	Code Label
40,404	48.5	1	Before
42,856	51.5	2	After

Variable Name	Variable Label	Format	Type	Length
State	Individual state	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
523	1.3	687	1.6	1	Alabama
370	0.9	303	0.7	2	Alaska
824	2.0	981	2.3	3	Arizona
880	2.2	1,032	2.4	4	Arkansas

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
1,336	3.3	1,450	3.4	5	California	
1,155	2.9	1,317	3.1	6	Colorado	
1,012	2.5	983	2.3	7	Connecticut	
0	0.0	0	0.0	8	Delaware*	
1,275	3.2	1,476	3.4	9	Florida	
825	2.0	758	1.8	10	Georgia	
927	2.3	637	1.5	11	Hawaii	
1,284	3.2	889	2.1	12	Idaho	
691	1.7	1,032	2.4	13	Illinois	
901	2.2	1,003	2.3	14	Indiana	
1,385	3.4	1,427	3.3	15	Iowa	
989	2.4	1,613	3.8	16	Kansas	
604	1.5	930	2.2	17	Kentucky	
0	0.0	0	0.0	18	Louisiana*	
0	0.0	0	0.0	19	Maine*	
1,071	2.7	992	2.3	20	Maryland	
1,007	2.5	697	1.6	21	Massachusetts	
0	0.0	0	0.0	22	Michigan*	
0	0.0	0	0.0	23	Minnesota*	
770	1.9	474	1.1	24	Mississippi	
928	2.3	1,184	2.8	25	Missouri	
625	1.5	473	1.1	26	Montana	
1,425	3.5	1,113	2.6	27	Nebraska	
1,009	2.5	1,185	2.8	28	Nevada	
720	1.8	577	1.3	29	New Hampshire	
1,982	4.9	2,210	5.2	30	New Jersey	

Variable Name		Variable Label		Format	Type	Length
State		Individual state		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
1,108	2.7	951	2.2	31	New Mexico	
0	0.0	0	0.0	32	New York*	
977	2.4	948	2.2	33	North Carolina	
0	0.0	0	0.0	34	North Dakota*	
0	0.0	1,223	2.9	35	Ohio**	
0	0.0	0	0.0	36	Oklahoma*	
834	2.1	796	1.9	37	Oregon	
1,181	2.9	1,194	2.8	38	Pennsylvania	
0	0.0	59	0.1	39	Rhode Island**	
0	0.0	0	0.0	40	South Carolina*	
984	2.4	1,173	2.7	41	South Dakota	
658	1.6	760	1.8	42	Tennessee	
3,798	9.4	3,562	8.3	43	Texas	
0	0.0	0	0.0	44	Utah*	
591	1.5	595	1.4	45	Vermont	
764	1.9	825	1.9	46	Virginia	
876	2.2	812	1.9	47	Washington	
798	2.0	786	1.8	48	West Virginia	
833	2.1	851	2.0	49	Wisconsin	
617	1.5	571	1.3	50	Wyoming	
776	1.9	844	2.0	51	Washington DC	
300	0.7	267	0.6	52	Mariana Islands	
791	2.0	1,216	2.8	53	Indian Tribal Organizations	

Notes:

This variable "State" identifies individual states, Indian Tribal Organizations, and territories. ITO data have been consolidated.

* Indicates states that did not participate in the NATFAN study (no data for these states)

Variable Name	Variable Label	Format	Type	Length
State	Individual state	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
** Indicates states that participated only in the "After" NATFAN study surveys.					

Variable Name	Variable Label	Format	Type	Length
Region	USDA Region Number	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
3,335	8.3	2,911	6.8	1	Northeast
6,572	16.3	6,851	16.0	2	Mid-Atlantic
5,632	13.9	6,041	14.1	3	Southeast
2,425	6.0	4,109	9.6	4	Midwest
6,260	15.5	6,411	15.0	5	Southwest
8,168	20.2	8,988	21.0	6	Mountain Plains
8,012	19.8	7,545	17.6	7	Western

Question 68: ***How many cups of milk does YOUR CHILD usually drink in a day? 1 cup = 8 oz***

Variable Name	Variable Label	Format	Type	Length
C68MILK	Cups of milk	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
883	2.2	735	1.7	0	My CHILD DOES NOT drink milk
814	2.0	973	2.3	1	Less than 1 cup
3,214	8.0	3,564	8.3	2	1 cup
11,051	27.4	12,354	28.8	3	2 cups
13,759	34.1	13,876	32.4	4	3 cups

Question 68: ***How many cups of milk does YOUR CHILD usually drink in a day? 1 cup = 8 oz***						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C68MILK		Cups of milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
8,567	21.2	8,608	20.1	5	4 or more cups	
2,116	5.2	2,746	6.4	999	Missing	

Question 69: ***What kind of milk does YOUR CHILD drink most often?***						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C69KIND		Kind of milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
967	2.4	817	1.9	0	My CHILD DOES NOT drink milk	
33,602	83.2	35,748	83.4	1	Cow’s milk	
1,772	4.4	1,723	4.0	2	Lactaid or lactose free milk	
582	1.4	6,82	1.6	3	Soy milk	
111	0.3	78	0.2	4	Goats milk	
131	0.3	144	0.3	5	Rice milk	
3,239	8.0	3,664	8.5	999	Missing	

Question 70: *What type of cow's milk does YOUR CHILD drink most often?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C70TYPE		Type of cows milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,474	3.6	1,409	3.3	0	My CHILD DOES NOT drink cow's milk	
17,502	43.3	13,098	30.6	1	Whole milk	
14,221	35.2	17,885	41.7	2	2% milk	
2,417	6.0	4,719	11.0	3	1% milk	
182	0.5	58	0.1	4	½% milk	
938	2.3	1,119	2.6	5	Skim (fat free) milk	
346	0.9	201	0.5	6	I DO NOT know	
3,324	8.2	4,367	10.2	999	Missing	

Question 71: *How often does YOUR CHILD drink 100% juice such as orange, apple, or tomato?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C71JUI		Drink juice		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,684	4.2	2,124	5.0	0	Never or less than once per week	
7,428	18.4	8,476	19.8	1	1 to 3 times per week	
4,997	12.4	5,204	12.1	2	4 to 6 times per week	
6,106	15.1	6,590	15.4	3	1 time per day	
9,607	23.8	9,790	22.8	4	2 times per day	
5,544	13.7	5,187	12.1	5	3 times per day	
2,731	6.8	2,487	5.8	6	4 or more times per day	
2,307	5.7	2,998	7.0	999	Missing	

Question 72: *How often does YOUR CHILD drink soy milk?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C72SOY		Drink soy milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
3,3719	83.5	35,305	82.4	0	Never or less than once per week	
917	2.3	887	2.1	1	1 to 3 times per week	
241	0.6	212	0.5	2	4 to 6 times per week	
350	0.9	340	0.8	3	1 time per day	
354	0.9	411	1.0	4	2 times per day	
302	0.7	333	0.8	5	3 times per day	
262	0.6	238	0.6	6	4 or more times per day	
4,259	10.5	5,130	12.0	999	Missing	

Question 73: *How often does YOUR CHILD drink artificially sweetened drinks such as diet cola, diet soda, or Crystal Light?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
C73ART	Artificial drinks		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
26,848	66.4	27,767	64.8	0	Never or less than once per week
6,993	17.3	7,445	17.4	1	1 to 3 times per week
993	2.5	998	2.3	2	4 to 6 times per week
1,485	3.7	1,668	3.9	3	1 time per day
597	1.5	651	1.5	4	2 times per day
189	0.5	219	0.5	5	3 times per day
146	0.4	152	0.4	6	4 or more times per day
3,153	7.8	3,956	9.2	999	Missing

Question 74: *How often does YOUR CHILD drink sugar sweetened drinks such as Kool Aid, soda, cola, sport drinks, or sugar sweetened tea?*					
Variable Name	**Variable Label**		**Format**	**Type**	**Length**
C74SUG	Sugar sweetened		F8	Numeric	8
Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
16,878	41.8	17,311	40.4	0	Never or less than once per week
12,435	30.8	13,153	30.7	1	1 to 3 times per week
2,441	6.0	2,717	6.3	2	4 to 6 times per week
2,919	7.2	2,976	6.9	3	1 time per day
1,600	4.0	1,720	4.0	4	2 times per day
628	1.6	681	1.6	5	3 times per day
426	1.1	454	1.1	6	4 or more times per day
3,077	7.6	3,844	9.0	999	Missing

Question 75: *How often does YOUR CHILD eat fruit? This DOES NOT include juice.*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C75FRUI		Eat fruit		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
951	2.4	842	2.0	0	Never or less than once per week	
5,358	13.3	4,773	11.1	1	1 to 3 times per week	
6,672	16.5	6,567	15.3	2	4 to 6 times per week	
6,706	16.6	6,557	15.3	3	1 time per day	
10,182	25.2	11,133	26.0	4	2 times per day	
5,126	12.7	6,206	14.5	5	3 times per day	
2,602	6.4	3,382	7.9	6	4 or more times per day	
2,807	6.9	3,396	7.9	999	Missing	

Question 76: *How often does YOUR CHILD eat vegetables such as salad, carrots, or sweet potatoes? This DOES NOT include potatoes, French fries or potato chips.*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C76VEGE		Eat vegetables		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,891	4.7	1,805	4.2	0	Never or less than once per week	
7,505	18.6	7,172	16.7	1	1 to 3 times per week	
6,368	15.8	6,366	14.9	2	4 to 6 times per week	
7,614	18.8	7,979	18.6	3	1 time per day	
9,004	22.3	9,724	22.7	4	2 times per day	
3,726	9.2	4,502	10.5	5	3 times per day	
1,812	4.5	2,307	5.4	6	4 or more times per day	
2,484	6.1	3,001	7.0	999	Missing	

Question 77: *How often does YOUR CHILD eat corn tortillas?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C77CT		Corn tortillas		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
17,697	43.8	19,141	44.7	0	Never or less than once per week	
11,224	27.8	11,732	27.4	1	1 to 3 times per week	
2,089	5.2	2,029	4.7	2	4 to 6 times per week	
3,208	7.9	3,418	8.0	3	1 time per day	
2,254	5.6	2,294	5.4	4	2 times per day	
747	1.8	687	1.6	5	3 times per day	
330	0.8	283	0.7	6	4 or more times per day	
2,855	7.1	3,272	7.6	999	Missing	

Question 78: *How often does YOUR CHILD eat whole-wheat tortillas?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C78WWT		Whole wheat tortillas		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
27,997	69.3	26,138	61.0	0	Never or less than once per week	
6,216	15.4	8460	19.7	1	1 to 3 times per week	
749	1.9	1,159	2.7	2	4 to 6 times per week	
1,368	3.4	1,730	4.0	3	1 time per day	
471	1.2	601	1.4	4	2 times per day	
166	0.4	180	0.4	5	3 times per day	
82	0.2	126	0.3	6	4 or more times per day	
3,355	8.3	4,462	10.4	999	Missing	

Question 79: ***How often does YOUR CHILD eat whole-wheat or whole-grain bread?***

Variable Name	Variable Label	Format	Type	Length
C79WWB	Whole wheat bread	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
9,445	23.4	6,132	14.3	0	Never or less than once per week
11,889	29.4	11,911	27.8	1	1 to 3 times per week
5,626	13.9	7,319	17.1	2	4 to 6 times per week
6,037	14.9	7,787	18.2	3	1 time per day
3,235	8.0	4,056	9.5	4	2 times per day
774	1.9	1,040	2.4	5	3 times per day
449	1.1	587	1.4	6	4 or more times per day
2,949	7.3	4,024	9.4	999	Missing

Question 80: ***How often does YOUR CHILD eat brown rice?***

Variable Name	Variable Label	Format	Type	Length
C80BR	Brown rice	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
23,546	58.3	22,679	52.9	0	Never or less than once per week
8,882	22.0	10,660	24.9	1	1 to 3 times per week
1,724	4.3	2,140	5.0	2	4 to 6 times per week
1,820	4.5	2,048	4.8	3	1 time per day

Question 80: ***How often does YOUR CHILD eat brown rice?***

Variable Name	Variable Label	Format	Type	Length
C80BR	Brown rice	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
625	1.5	754	1.8	4	2 times per day
218	0.5	217	0.5	5	3 times per day
145	0.4	172	0.4	6	4 or more times per day
3,444	8.5	4,186	9.8	999	Missing

Question 81: ***How often does YOUR CHILD eat oatmeal?***

Variable Name	Variable Label	Format	Type	Length
C81OAT	Oatmeal	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
11,698	29.0	12,855	30.0	0	Never or less than once per week
14,758	36.5	15,172	35.4	1	1 to 3 times per week
4,682	11.6	4,605	10.7	2	4 to 6 times per week
4,606	11.4	4,581	10.7	3	1 time per day
991	2.5	931	2.2	4	2 times per day
373	0.9	345	0.8	5	3 times per day
380	0.9	369	0.9	6	4 or more times per day
2,916	7.2	3,998	9.3	999	Missing

Question 82: *How often does YOUR CHILD eat white bread?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C82WB		White bread		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
10,340	25.6	13,929	32.5	0	Never or less than once per week	
12,571	31.1	12,447	29.0	1	1 to 3 times per week	
5,567	13.8	4,985	11.6	2	4 to 6 times per week	
5,234	13.0	4,478	10.4	3	1 time per day	
2,424	6.0	1,931	4.5	4	2 times per day	
736	1.8	577	1.3	5	3 times per day	
555	1.4	515	1.2	6	4 or more times per day	
2,977	7.4	3,994	9.3	999	Missing	

Question 83: *How often does YOUR CHILD eat white flour tortillas?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C83WFT		White flour tortillas		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
21,060	52.1	23,050	53.8	0	Never or less than once per week	
10,849	26.9	10,892	25.4	1	1 to 3 times per week	
2,052	5.1	1,912	4.5	2	4 to 6 times per week	
1,766	4.4	1,605	3.7	3	1 time per day	
672	1.7	577	1.3	4	2 times per day	
230	0.6	217	0.5	5	3 times per day	
153	0.4	186	0.4	6	4 or more times per day	
3,622	9.0	4,417	10.3	999	Missing	

Question 84: ***How often does YOUR CHILD eat white rice?***

Variable Name	Variable Label	Format	Type	Length
C84WR	White rice	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
10,627	26.3	12,221	28.5	0	Never or less than once per week
16,579	41.0	16,834	39.3	1	1 to 3 times per week
4,534	11.2	4,574	10.7	2	4 to 6 times per week
3,227	8.0	3,237	7.6	3	1 time per day
1,566	3.9	1,555	3.6	4	2 times per day
688	1.7	608	1.4	5	3 times per day
501	1.2	521	1.2	6	4 or more times per day
2,682	6.6	3,306	7.7	999	Missing

Question 85: ***During the past year, which fruits did YOUR CHILD usually eat?***
MY CHILD DOES NOT eat fruit

Variable Name	Variable Label	Format	Type	Length
C85NOFR	Child does not eat fruit	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
38,215	94.6	40,221	93.9	0	Not Selected
246	0.6	211	0.5	1	Selected
138	0.3	85	0.2	-8	Selected this item and also selected fruit
1,805	4.5	2,339	5.5	999	Missing

Notes: If the response option 'I DO NOT eat fruit' was selected but one or more fruit items were marked, the value for the response to this option was coded as '-8.' All sub-item responses were coded as missing when respondents did not select any of the possible responses.

C85APPLE		Apples		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
3,733	9.2	3,962	9.2	0	Not selected	
34,866	86.3	36,555	85.3	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85APR1		Fresh apricots		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
35,063	86.8	38,132	89.0	0	Not selected	
3,536	8.8	2,385	5.6	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85APR2		Dried apricots		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
36,991	91.6	37,161	86.7	0	Not selected	
1,608	4.0	3,356	7.8	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85BAN		Bananas		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
2,804	6.9	2,885	6.7	0	Not selected	
35,795	88.6	37,632	87.8	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85BERR		Berries		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
26,509	65.6	25,522	59.6	0	Not selected	
12,090	29.9	14,995	35.0	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85MELON		Melons		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,865	41.7	15,673	36.6	0	Not selected	
21,734	53.8	24,844	58.0	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85CHERR		Cherries		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
26,961	66.7	25,733	60.0	0	Not selected	
11,638	28.8	14,784	34.5	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85DATE		Dates		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
37,684	93.3	39,826	92.9	0	Not selected	
915	2.3	691	1.6	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85FIGS		Figs		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
36,722	90.9	39,113	91.3	0	Not selected	
1,877	4.6	1,404	3.3	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85GRPFT		Grapefruit		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
32,422	80.2	35,930	83.8	0	Not selected	
6,177	15.3	4,587	10.7	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85GRAPE		Grapes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
7,872	19.5	7,255	16.9	0	Not selected	
30,727	76.0	33,262	77.6	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85KIWIS		Kiwis		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
30,180	74.7	31,271	73.0	0	Not selected	
8,419	20.8	9,246	21.6	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85LEMON		Lemon or Limes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
29,866	73.9	32,177	75.1	0	Not selected	
8,733	21.6	8,340	19.5	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85MANG		Mangos		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
24,304	60.2	24,800	57.9	0	Not selected	
14,295	35.4	15,717	36.7	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85NECT		Nectarines		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
30,472	75.4	30,696	71.6	0	Not selected	
8,127	20.1	9,821	22.9	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85ORAN		Oranges		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
7,734	19.1	8,243	19.2	0	Not selected	
30,865	76.4	32,274	75.3	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85PAPA		Papayas		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
32,450	80.3	34,238	79.9	0	Not selected	
6,149	15.2	6,279	14.7	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85PEACH		Peaches		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
14,420	35.7	14,750	34.4	0	Not selected	
24,179	59.8	25,767	60.1	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85PEARS		Pears		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,770	41.5	18,316	42.7	0	Not selected	
21,829	54.0	22,201	51.8	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85PINE		Pineapple		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
17,910	44.3	18,748	43.7	0	Not selected	
20,689	51.2	21,769	50.8	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85PLUMS		Plums		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
29,467	72.9	30,375	70.9	0	Not selected	
9,132	22.6	10,142	23.7	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85PRUNE		Prunes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
34,783	86.1	37,075	86.5	0	Not selected	
3,816	9.4	3,442	8.0	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85RAISIN		Raisins		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
22,973	56.9	25,215	58.8	0	Not selected	
15,626	38.7	15,302	35.7	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85RHUB		Rhubarb		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
37,830	93.6	39,836	93.0	0	Not selected	
769	1.9	681	1.6	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85STRAW		Strawberries		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
10,513	26.0	9,024	21.1	0	Not selected	
28,086	69.5	31,493	73.5	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85TANG		Tangerines		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
27,155	67.2	29,526	68.9	0	Not selected	
11,444	28.3	10,991	25.6	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85WATER		Watermelon		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
11,600	28.7	9,955	23.2	0	Not selected	
26,999	66.8	30,562	71.3	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

C85OTHER		Other		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
37,870	93.7	39,798	92.9	0	Not selected	
729	1.8	719	1.7	1	Selected	
1,805	4.5	2,339	5.5	999	Missing	

Question 86: *During the past year, which vegetables did YOUR CHILD usually eat?* ***MY CHILD DOES NOT Eat Vegetables***						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C86NOVEGE		My child does not eat vegetables		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
37,926	93.9	39,916	93.1	0	Not selected	
441	1.1	372	0.9	1	Selected	
68	0.2	129	0.3	-8	Selected this item and also selected vegetable	
1,969	4.9	2,439	5.7	999	Missing	
Notes: If a participant selected the option 'I DO NOT eat vegetables' but also marked one or more vegetables, the value for the response to this option was coded as '-8.' All sub-item responses were coded as missing when respondents did not select any of the possible responses.						

C86ASPA		Asparagus		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
33,203	82.2	34,564	80.7	0	Not selected	
5,232	12.9	5,853	13.7	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86AVOC		Avocados		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
27,834	68.9	28,406	66.3	0	Not selected	
10,601	26.2	12,011	28.0	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86BEETS		Beets		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
35,268	87.3	37,240	86.9	0	Not selected	
3,167	7.8	3,177	7.4	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86BROCC		Broccoli		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
11,842	29.3	11,927	27.8	0	Not selected	
26,593	65.8	28,490	66.5	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86BRUSS		Brussels sprouts		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
35,820	88.7	37,590	87.7	0	Not selected	
2,615	6.5	2,827	6.6	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86CABB		Cabbage		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
24,188	59.9	25,788	60.2	0	Not selected	
14,247	35.3	14,629	34.1	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86CARR		Carrots		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
6,483	16.0	7,472	17.4	0	Not selected	
31,952	79.1	32,945	76.9	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86CAULI		Cauliflower		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
26,401	65.3	27,652	64.5	0	Not selected	
12,034	29.8	12,765	29.8	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86CHAY		Chayote		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
34,520	85.4	36,181	84.4	0	Not selected	
3,915	9.7	4,236	9.9	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86CORN		Corn		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
7,625	18.9	7,267	17.0	0	Not selected	
30,810	76.3	33,150	77.4	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86CUCU		Cucumber		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
19,334	47.9	18,692	43.6	0	Not selected	
19,101	47.3	21,725	50.7	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86EGGPL		Eggplant		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
36,047	89.2	38,042	88.8	0	Not selected	
2,388	5.9	2,375	5.5	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86GREEN		Greens		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
32,057	79.3	32,960	76.9	0	Not selected	
6,378	15.8	7,457	17.4	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86GBEAN		Green beans		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
12,156	30.1	12,708	29.7	0	Not selected	
26,279	65.0	27,709	64.7	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86GPEAS		Green peas		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
17,553	43.4	19,791	46.2	0	Not selected	
20,882	51.7	20,626	48.1	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86LETT		Lettuce		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
16,408	40.6	16,958	39.6	0	Not selected	
22,027	54.5	23,459	54.7	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86MUSH		Mushrooms		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
30,033	74.3	31,754	74.1	0	Not selected	
8,402	20.8	8,663	20.2	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86OKRA		Okra		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
34,836	86.2	36,463	85.1	0	Not selected	
3,599	8.9	3,954	9.2	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86ONION		Onions		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
24,528	60.7	24,558	57.3	0	Not selected	
13,907	34.4	15,859	37.0	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86PEPPER		Peppers		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
28,042	69.4	28,527	66.6	0	Not selected	
10,393	25.7	11,890	27.7	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86POTATO		Potatoes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
6,283	15.6	6,962	16.2	0	Not selected	
32,152	79.6	33,455	78.1	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86SPIN		Spinach		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
28,466	70.5	29,664	69.2	0	Not selected	
9,969	24.7	10,753	25.1	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86SSQUA		Summer squash		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
27,470	68.0	28,724	67.0	0	Not selected	
10,965	27.1	11,693	27.3	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86SWTPOT		Sweet potatoes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
21,760	53.9	24,066	56.2	0	Not selected	
16,675	41.3	16,351	38.2	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86TOMATO		Tomatoes		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
14,175	35.1	13,463	31.4	0	Not selected	
24,260	60.0	26,954	62.9	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86TOMATI		Tomatillos		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
35,652	88.2	37,395	87.3	0	Not selected	
2,783	6.9	3,022	7.1	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86WSQUA		Winter squash		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
32,370	80.1	34,283	80.0	0	Not selected	
6,065	15.0	6,134	14.3	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

C86OTHER		Other		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
37,832	93.6	39,796	92.9	0	Not selected	
603	1.5	621	1.4	1	Selected	
1,969	4.9	2,439	5.7	999	Missing	

Question 87: ***I am willing to give MY CHILD who is two years or older 2% milk.***

Variable Name	Variable Label	Format	Type	Length
C87	Willing to give 2 percent milk	F8	Numeric	8

Before		**After**			
N	**%**	**N**	**%**	**Code**	**Code Label**
3,109	7.7	3,052	7.1	1	Strongly Disagree
2,624	6.5	2,154	5.0	2	Disagree
4,767	11.8	4,043	9.4	3	Neither Agree nor Disagree
14,789	36.6	15,715	36.7	4	Agree
11,466	28.4	13,293	31.0	5	Strongly Agree
3,649	9.0	4,599	10.7	999	Missing

Question 88: *I am willing to give MY CHILD who is two years or older 1% milk.*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C88		Willing to give 1 percent milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
5,546	13.7	5,530	12.9	1	Strongly Disagree	
7,282	18.0	6,593	15.4	2	Disagree	
8,656	21.4	8,151	19.0	3	Neither Agree nor Disagree	
9,919	24.5	11,306	26.4	4	Agree	
4,590	11.4	5,917	13.8	5	Strongly Agree	
4,411	10.9	5,359	12.5	999	Missing	

Question 89: *I am willing to give MY CHILD who is two years or older skim milk (fat free).*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C89		Willing to give skim milk		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
9,276	23.0	9,480	22.1	1	Strongly Disagree	
9,410	23.3	9,244	21.6	2	Disagree	
8,321	20.6	8,272	19.3	3	Neither Agree nor Disagree	
6,057	15.0	6,799	15.9	4	Agree	
2,927	7.2	3,777	8.8	5	Strongly Agree	
4,413	10.9	5,284	12.3	999	Missing	

Question 90: *Do YOU have a CHILD one year or older who receives WIC foods?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C90WIC		Have a child over 1 on WIC		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
3,279	8.1	3,085	7.2	0	No	
34,016	84.2	36,347	84.8	1	Yes	
3,109	7.7	3,424	8.0	999	Missing	

Question 91: *If YES, did YOUR CHILD receive WIC foods in the past 30 days?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C91		Child received WIC in the past 30 days		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
5,490	13.6	6,925	16.2	0	No	
27,750	68.7	30,943	72.2	1	Yes	
7,164	17.7	4,988	11.6	999	Missing	

Question 92: *Are you the PRIMARY CAREGIVER for this CHILD?*						
Variable Name		**Variable Label**		**Format**	**Type**	**Length**
C92CARE		Primary caregiver of child		F8	Numeric	8
Before		**After**				
N	**%**	**N**	**%**	**Code**	**Code Label**	
1,096	2.7	1,148	2.7	0	No	
35,066	86.8	37,926	88.5	1	Yes	
4,242	10.5	3,782	8.8	999	Missing	

Question 93: ***This CHILD is a boy or girl?***

Variable Name	Variable Label	Format	Type	Length
C93SEX	Sex of child	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
19,007	47.0	19,755	46.1	1	Boy
17,984	44.5	18,708	43.7	2	Girl
3,413	8.4	4,393	10.3	999	Missing

Question 94: ***What is this CHILD'S age (in months)?***

Variable Name	Variable Label	Format	Type	Length
Child_age_month	Children age in months	F8	Numeric	8

Mean		Standard Deviation		Range		Percentile 25		Percentile 50		Percentile 75	
Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
30.9	31.2	13.3	13.3	47.0	47.0	20.0	20.0	30.0	30.0	41.0	42.0

Notes: This variable was created for the data set to provide values for children's ages in months. To create this value, the original values reported for "C94YEAR" were multiplied by 12, and the resulting totals added to the original values for "C94MONTH." When the questionnaires contained completed responses for "C94YEAR," any missing values for "C94MONTH" were set at 0, since the questionnaire did not include a "0" response option for "C94MONTH."

Question 95: ***What is YOUR age?***

Variable Name	Variable Label	Format	Type	Length
C95MOM	Women's age	F8	Numeric	8

Mean		Standard Deviation		Range		Percentile 25		Percentile 50		Percentile 75	
Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
28.4	28.7	7.8	7.7	89.0	83.0	23.0	23.0	27.0	27.0	32.0	33.0

Note: Reported ages younger than10 were coded as missing.

Question 97: ***What language is spoken MOST OFTEN at home?***

Variable Name	Variable Label	Format	Type	Length
C97LANG	Language spoken at home	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
24,197	59.9	24,908	58.1	1	English
5,465	13.5	5,872	13.7	2	Both Spanish and English
6,764	16.7	6,899	16.1	3	Spanish
598	1.5	599	1.4	4	Other
3,380	8.4	4,578	10.7	999	Missing

Question 98: ***What is YOUR race?***

Variable Name	Variable Label	Format	Type	Length
C98WNH	White, non-Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
21,582	53.4	23,147	54.0	0	Not selected
14,944	37.0	15,179	35.4	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Notes. All sub-item responses were coded as missing when respondents did not select any of the possible responses.

Variable Name	Variable Label	Format	Type	Length
C98WH	White, Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
26,351	65.2	27,025	63.1	0	Not selected
10,175	25.2	11,301	26.4	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Variable Name	Variable Label	Format	Type	Length
C98BNH	Black, non-Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
30,939	76.6	31,997	74.7	0	Not selected
5,587	13.8	6,329	14.8	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Variable Name	Variable Label	Format	Type	Length
C98BH	Black, Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
35,628	88.2	37,352	87.2	0	Not selected
898	2.2	974	2.3	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Variable Name	Variable Label	Format	Type	Length
C98NANH	Native American, non-Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
35,177	87.1	36,732	85.7	0	Not selected
1,349	3.3	1,594	3.7	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Variable Name	Variable Label	Format	Type	Length
C98NAH	Native American, Hispanic	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
35,613	88.1	37,465	87.4	0	Not selected
913	2.3	861	2.0	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Variable Name		Variable Label		Format	Type	Length
C98PINH		Pacific Islander, non-Hispanic		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
36,025	89.2	37,916	88.5	0	Not selected	
501	1.2	410	1.0	1	Selected	
3,878	9.6	4,530	10.6	999	Missing	

Variable Name		Variable Label		Format	Type	Length
C98PIH		Pacific Islander, Hispanic		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
36,270	89.8	38,129	89.0	0	Not selected	
256	0.6	197	0.5	1	Selected	
3,878	9.6	4,530	10.6	999	Missing	

Variable Name		Variable Label		Format	Type	Length
C98ANH		Asian, non-Hispanic		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
35,653	88.2	37,539	87.6	0	Not selected	
873	2.2	787	1.8	1	Selected	
3,878	9.6	4,530	10.6	999	Missing	

Variable Name		Variable Label		Format	Type	Length
C98AH		Asian, Hispanic		F8	Numeric	8
Before		After				
N	%	N	%	Code	Code Label	
36,236	89.7	38,115	88.9	0	Not selected	
290	0.7	211	0.5	1	Selected	
3,878	9.6	4,530	10.6	999	Missing	

Variable Name	Variable Label	Format	Type	Length
C98OTHER	Other	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
34,950	86.5	36,965	86.3	0	Not selected
1,576	3.9	1,361	3.2	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Variable Name	Variable Label	Format	Type	Length
C98REFU	Do not want to answer	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
35,445	87.7	37,326	87.1	0	Not selected
1,081	2.7	1,000	2.3	1	Selected
3,878	9.6	4,530	10.6	999	Missing

Question 99: ***What is the highest level of education YOU have completed?***

Variable Name	Variable Label	Format	Type	Length
C99EDUC	Highest level of education	F8	Numeric	8

Before		After			
N	%	N	%	Code	Code Label
2,003	5.0	2,025	4.7	1	1st to 6th grade
2,817	7.0	2,798	6.5	2	7th to 9th grade
5,841	14.5	6,011	14.0	3	10th to 12th grade
9,441	23.4	9,621	22.4	4	High School graduate
2,555	6.3	2,566	6.0	5	GED
8,274	20.5	8,922	20.8	6	Some college
3,015	7.5	3,403	7.9	7	Associates degree or Technical College degree
2,283	5.7	2,538	5.9	8	Bachelor's degree or higher
4,175	10.3	4,972	11.6	999	Missing

Appendices

Appendix A. Women, Infant and Child questionnaires

FOOD & NUTRITION QUESTIONNAIRE

WIC is changing. We want to be better for you! We need information about your eating habits so we can better meet your needs.

Completing this survey is voluntary. Refusing to fill out the questionnaire will not affect your WIC status. Your answers will be kept confidential and anonymous.

FOOD & NUTRITION QUESTIONNAIRE

NATFAN - Women

How to Mark the Answers Correctly

- Make heavy marks that fill the circles completely.
- Erase cleanly any answers you wish to change.
- Make no stray marks.

CORRECT: ●

PLEASE DO NOT WRITE IN THIS AREA

08162

WOMEN

Please fill out this section if YOU are pregnant, postpartum or breastfeeding.

How often do YOU do the following?	NEVER OR LESS THAN ONCE PER WEEK	1 TO 3 TIMES PER WEEK	4 TO 6 TIMES PER WEEK	1 TIME PER DAY	2 TIMES PER DAY	3 TIMES PER DAY	4 OR MORE TIMES PER DAY
1. Drink 100% juice such as orange, apple, or tomato.	○	○	○	○	○	○	○
2. Drink soy milk.	○	○	○	○	○	○	○
3. Drink artificially sweetened drinks such as diet cola, diet soda, or Crystal Light®.	○	○	○	○	○	○	○
4. Drink sugar sweetened drinks such as Kool Aid®, soda, cola, sport drinks, or sugar sweetened tea.	○	○	○	○	○	○	○
5. Eat fruit. This DOES NOT include juice.	○	○	○	○	○	○	○
6. Eat vegetables such as salad, carrots, or sweet potatoes. This DOES NOT include potatoes, French fries or potato chips.	○	○	○	○	○	○	○

THE NEXT QUESTIONS ARE ABOUT GRAIN PRODUCTS.

How many times do YOU:	NEVER OR LESS THAN ONCE PER WEEK	1 TO 3 TIMES PER WEEK	4 TO 6 TIMES PER WEEK	1 TIME PER DAY	2 TIMES PER DAY	3 TIMES PER DAY	4 OR MORE TIMES PER DAY
7. Eat corn tortillas.	○	○	○	○	○	○	○
8. Eat whole-wheat tortillas.	○	○	○	○	○	○	○
9. Eat whole-wheat or whole grain bread.	○	○	○	○	○	○	○
10. Eat brown rice.	○	○	○	○	○	○	○
11. Eat oatmeal.	○	○	○	○	○	○	○
12. Eat white bread.	○	○	○	○	○	○	○
13. Eat white flour tortillas.	○	○	○	○	○	○	○
14. Eat white rice.	○	○	○	○	○	○	○

15. **During the *past year*, which fruits did YOU *usually* eat? *(Choose all that apply - you can choose more than one)***

- ○ Apples
- ○ Apricots (fresh)
- ○ Apricots (dried)
- ○ Bananas
- ○ Berries (blueberries, blackberries, raspberries)
- ○ Melons (cantaloupe, honeydew)
- ○ Cherries
- ○ Dates
- ○ Figs
- ○ Grapefruit
- ○ Grapes
- ○ Kiwis
- ○ Lemons or Limes
- ○ Mangos
- ○ Nectarines
- ○ Oranges
- ○ Papayas
- ○ Peaches
- ○ Pears
- ○ Pineapple
- ○ Plums
- ○ Prunes
- ○ Raisins
- ○ Rhubarb
- ○ Strawberries
- ○ Tangerines
- ○ Watermelon
- ○ Other (please specify) _____
- ○ **I DO NOT** eat fruit

16. **During the *past year*, which vegetables did YOU *usually* eat? *(Choose all that apply - you can choose more than one)***

- ○ Asparagus
- ○ Avocados
- ○ Beets
- ○ Broccoli
- ○ Brussel Sprouts
- ○ Cabbage
- ○ Carrots
- ○ Cauliflower
- ○ Chayote
- ○ Corn
- ○ Cucumbers
- ○ Eggplant
- ○ Greens (collard, mustard, turnip)
- ○ Green Beans
- ○ Green Peas
- ○ Lettuce (all varieties)
- ○ Mushrooms
- ○ Okra
- ○ Onions
- ○ Peppers (Bell, green, yellow, orange, or red)
- ○ Potatoes
- ○ Spinach
- ○ Summer Squash (yellow, zucchini)
- ○ Sweet Potatoes
- ○ Tomatoes
- ○ Tomatillos
- ○ Winter Squash (acorn, pumpkin)
- ○ Other (please specify) _____
- ○ **I DO NOT** eat vegetables

17. **How many cups of milk do YOU drink in a day? *(Choose one only)* 1 cup = 8 oz**

- ○ Less than 1 cup
- ○ 1 cup
- ○ 2 cups
- ○ 3 cups
- ○ 4 or more cups
- ○ **I DO NOT** drink milk

18. **What kind of milk do YOU drink most often? *(Choose one only)***

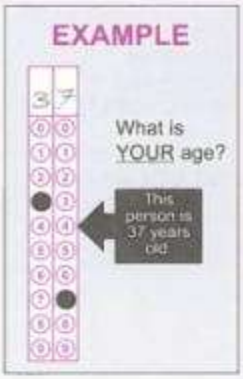
- ○ Cow's milk
- ○ Lactaid or lactose free milk
- ○ Soy milk
- ○ Goat's milk
- ○ Rice milk
- ○ **I DO NOT** drink milk

19. **What type of cow's milk do YOU *usually* drink? *(Choose one only)***

- ○ Whole milk
- ○ 2% milk
- ○ 1% milk
- ○ ½% milk
- ○ Skim (fat free) milk
- ○ **I DO NOT** drink cow's milk
- ○ **I DO NOT** know

Please choose the best answer for each of the following statements:	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
20. I am willing to drink 2% milk.	○	○	○	○	○
21. I am willing to drink 1% milk.	○	○	○	○	○
22. I am willing to drink skim milk (fat free).	○	○	○	○	○

By using the example below, please answer the following questions:



23. What is YOUR age?

24. What is YOUR Zip code?

25. What language is spoken MOST OFTEN at home? ***(Choose one only)***

- ○ English
- ○ Spanish
- ○ Both Spanish and English
- ○ Other (Please specify) _____

26. What is YOUR race? ***(Choose all that apply - you can choose more than one)***

- ○ White, non-Hispanic
- ○ White, Hispanic
- ○ Black, non-Hispanic
- ○ Black, Hispanic
- ○ Native American, non-Hispanic
- ○ Native American, Hispanic
- ○ Pacific Islander, non-Hispanic
- ○ Pacific Islander, Hispanic
- ○ Asian, non-Hispanic
- ○ Asian, Hispanic
- ○ Other (Please specify) _____
- ○ **I DO NOT** want to answer

27. What is the highest level of education YOU have completed?

- ○ 1st - 6th grade
- ○ 7th - 9th grade
- ○ 10th - 12th grade
- ○ High School graduate
- ○ GED
- ○ Some College
- ○ Associate's degree or Technical College degree
- ○ Bachelor's degree or higher

28. Did YOU receive WIC foods for yourself in the past 30 days?

- ○ Yes
- ○ No

29. Are YOU currently pregnant?

- ○ Yes
- ○ No
- ○ **I DO NOT** know

30. Have YOU had a baby within the last 6 months?

- ○ Yes
- ○ No

31. Are YOU currently breastfeeding?

- ○ Yes
- ○ No

YOU HAVE FINISHED THIS SURVEY.
PLEASE COMPLETE ANY ADDITIONAL (Infant or Child) SURVEYS AS NEEDED.
THANK YOU.

PLEASE DO NOT WRITE IN THIS AREA

08162

FOOD & NUTRITION QUESTIONNAIRE

WIC is changing. We want to be better for you! We need information about your eating habits so we can better meet your needs.

Completing this survey is voluntary. Refusing to fill out the questionnaire will not affect your WIC status. Your answers will be kept confidential and anonymous.

FOOD & NUTRITION QUESTIONNAIRE

NATFAN - Infants
(Birth to 11 months of age)

How to Mark the Answers Correctly

- Make heavy marks that fill the circles completely.
- Erase cleanly any answers you wish to change.
- Make no stray marks.

CORRECT: ●

PLEASE DO NOT WRITE IN THIS AREA

08581

INFANTS

Please fill out this section only if you have an INFANT aged less than 12 months.

32. Is YOUR INFANT currently breastfed or given breast milk?

○ Yes ○ No

33. Was YOUR INFANT ever breastfed at least one time?

○ Yes ○ No ○ Don't know/not sure

34. What was the age of YOUR INFANT when you STOPPED breastfeeding?

○ Less than 1 month
○ 1 to 2 months
○ 3 to 4 months
○ 5 to 6 months
○ 7 to 8 months
○ 9 to 10 months
○ 11 months
○ Still breastfeeding

35. How many ounces of formula does YOUR INFANT drink per feeding?
Ounces per feeding

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯

○ **MY INFANT DOES NOT** drink formula

36. How often does YOUR INFANT drink formula?

○ Never or less than once per week
○ 1 to 2 times per week
○ 3 to 4 times per week
○ 5 to 6 times per week
○ 1 time per day
○ 2 to 3 times per day
○ 4 to 5 times per day
○ 6 to 7 times per day
○ 8 to 9 times per day
○ 10 to 11 times per day
○ 12 to13 times per day
○ 14 or more times per day

37. When you run out of WIC formula, what do YOU *usually* do? *(Choose one only)*

○ Formula **DOES NOT** *usually* run out.
○ I buy or am given additional formula.
○ I add extra milk to the formula.
○ I add cereal to the formula.
○ I add extra water to the formula.
○ I try to give more breast milk.
○ I breastfeed my infant.
○ **MY INFANT DOES NOT** drink formula.

38. What kinds of baby food do you feed YOUR INFANT?
(Choose all that apply - you can choose more than one)

○ Fruits
○ Vegetables
○ Cereal
○ Meats
○ Dinners
○ Dessert
○ Others (Please specify) _____
○ **I DO NOT** feed **MY INFANT** jars/containers of baby food

39. How many jars/containers of baby food do you feed YOUR INFANT in an average week?

NO. OF JARS/CONTAINERS

How often does YOUR INFANT do the following?	NEVER OR LESS THAN ONCE PER WEEK	1 TO 3 TIMES PER WEEK	4 TO 6 TIMES PER WEEK	1 TIME PER DAY	2 TIMES PER DAY	3 TIMES PER DAY	4 OR MORE TIMES PER DAY
40. Drink milk other than breast milk or formula.	○	○	○	○	○	○	○
41. Drink soy milk.	○	○	○	○	○	○	○
42. Drink 100% juice such as apple, orange, or tomato.	○	○	○	○	○	○	○
43. Drink other drinks such as Kool-Aid®, sugar water, soda, cola, sports drinks, or sweet tea.	○	○	○	○	○	○	○
44. Eat cereal.	○	○	○	○	○	○	○
45. Eat fruits.	○	○	○	○	○	○	○
46. Eat vegetables.	○	○	○	○	○	○	○
47. Eat meat.	○	○	○	○	○	○	○
48. Eat desserts.	○	○	○	○	○	○	○

Please choose the age at which the following foods (jarred or prepared) were *first* fed to YOUR INFANT:	MY INFANT DOES NOT EAT THIS	LESS THAN 4 MONTHS OLD	4 TO 5 MONTHS OLD	6 MONTHS OLD	7 TO 8 MONTHS OLD	9 TO 11 MONTHS OLD
49. Cereal	○	○	○	○	○	○
50. Vegetables	○	○	○	○	○	○
51. Fruits	○	○	○	○	○	○
52. Meats	○	○	○	○	○	○
53. Desserts	○	○	○	○	○	○
54. 100% juice such as apple, orange or tomato	○	○	○	○	○	○
55. Formula	○	○	○	○	○	○
56. Regular Milk	○	○	○	○	○	○
57. Other drinks such as Kool-Aid®, soda, cola, sports drinks, tea, sugar-water, or diet drinks	○	○	○	○	○	○

58. Do you have an INFANT (younger than 12 months) in your household who receives WIC foods or formula?
○ Yes ○ No

59. If YES, did YOUR INFANT receive WIC foods or formula in the past 30 days?
○ Yes ○ No

60. Are YOU the PRIMARY CAREGIVER for this INFANT?
○ Yes ○ No

61. Is this INFANT a:
○ Boy ○ Girl

62. How old is YOUR INFANT?
○ Less than 1 month old
○ 1 to 2 months old
○ 3 to 4 months old
○ 5 months old
○ 6 months old
○ 7 to 8 months old
○ 9 to 10 months old
○ 11 months old

By using the example below, please answer the following questions:

63. What is YOUR age?

64. What is YOUR Zip code?

65. What language is spoken MOST OFTEN at home? *(Choose one only)*
○ English
○ Spanish
○ Both Spanish and English
○ Other (Please specify) _____

66. What is YOUR race? *(Choose all that apply - you can choose more than one)*
○ White, non-Hispanic
○ White, Hispanic
○ Black, non-Hispanic
○ Black, Hispanic
○ Native American, non-Hispanic
○ Native American, Hispanic
○ Pacific Islander, non-Hispanic
○ Pacific Islander, Hispanic
○ Asian, non-Hispanic
○ Asian, Hispanic
○ Other (Please specify) _____
○ **I DO NOT** want to answer

67. What is the highest level of education YOU have completed?
○ 1st - 6th grade
○ 7th - 9th grade
○ 10th - 12th grade
○ High School graduate
○ GED
○ Some College
○ Associate's degree or Technical College degree
○ Bachelor's degree or higher

YOU HAVE FINISHED THIS SURVEY.
PLEASE COMPLETE ANY ADDITIONAL (Woman or Child) SURVEYS AS NEEDED.
THANK YOU!

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PLEASE DO NOT WRITE IN THIS AREA

FOOD & NUTRITION QUESTIONNAIRE

WIC is changing. We want to be better for you! We need information about your eating habits so we can better meet your needs.

Completing this survey is voluntary. Refusing to fill out the questionnaire will not affect your WIC status. Your answers will be kept confidential and anonymous.

FOOD & NUTRITION QUESTIONNAIRE

NATFAN - CHILDREN
(1 Year to under 5 Years)

How to Mark the Answers Correctly

- Make heavy marks that fill the circles completely.
- Erase cleanly any answer you wish to change.
- Make no stray marks.

CORRECT: ●

PLEASE DO NOT WRITE IN THIS AREA

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CHILDREN

If you have a CHILD between the ages one and five years, please complete the next section.

68. How many cups of milk does YOUR CHILD *usually* drink in a day? *(Choose one only)*
1 cup = 8 oz

- ○ Less than 1 cup
- ○ 1 cup
- ○ 2 cups
- ○ 3 cups
- ○ 4 or more cups
- ○ **MY CHILD DOES NOT** drink milk

69. What kind of milk does YOUR CHILD drink most often? *(Choose one only)*

- ○ Cow's milk
- ○ Lactaid or lactose free milk
- ○ Soy milk
- ○ Goat's milk
- ○ Rice milk
- ○ **MY CHILD DOES NOT** drink milk

70. What type of cow's milk does YOUR CHILD drink most often? *(Choose one only)*

- ○ Whole milk
- ○ 2% milk
- ○ 1% milk
- ○ ½% milk
- ○ Skim (fat free) milk
- ○ **MY CHILD DOES NOT** drink cow's milk
- ○ **I DO NOT** know

How often does YOUR CHILD do the following?	NEVER OR LESS THAN ONCE PER WEEK	1 TO 3 TIMES PER WEEK	4 TO 6 TIMES PER WEEK	1 TIME PER DAY	2 TIMES PER DAY	3 TIMES PER DAY	4 OR MORE TIMES PER DAY
71. Drink 100% juice such as apple, orange, or tomato.	○	○	○	○	○	○	○
72. Drink soy milk.	○	○	○	○	○	○	○
73. Drink artificially sweetened drinks such as diet cola, diet soda, or Crystal Light®.	○	○	○	○	○	○	○
74. Drink sugar sweetened drinks such as Kool-Aid®, soda, cola, sport drinks, or sugar sweetened tea.	○	○	○	○	○	○	○
75. Eat fruit. This DOES NOT include juice.	○	○	○	○	○	○	○
76. Eat vegetables such as salad, carrots, or sweet potatoes. This DOES NOT include potatoes, French fries, or potato chips.	○	○	○	○	○	○	○

THE NEXT QUESTIONS ARE ABOUT GRAIN PRODUCTS.

How often does YOUR CHILD do the following?	NEVER OR LESS THAN ONCE PER WEEK	1 TO 3 TIMES PER WEEK	4 TO 6 TIMES PER WEEK	1 TIME PER DAY	2 TIMES PER DAY	3 TIMES PER DAY	4 OR MORE TIMES PER DAY
77. Eat corn tortillas.	○	○	○	○	○	○	○
78. Eat whole-wheat tortillas.	○	○	○	○	○	○	○
79. Eat whole-wheat or whole grain bread.	○	○	○	○	○	○	○
80. Eat brown rice.	○	○	○	○	○	○	○
81. Eat oatmeal.	○	○	○	○	○	○	○
82. Eat white bread.	○	○	○	○	○	○	○
83. Eat white flour tortillas.	○	○	○	○	○	○	○
84. Eat white rice.	○	○	○	○	○	○	○

85. During the *past year*, which fruits did YOUR CHILD *usually* eat?
(Choose all that apply - you can choose more than one)

- ○ Apples
- ○ Apricots (dried)
- ○ Apricots (fresh)
- ○ Bananas
- ○ Berries (blueberries, blackberries, raspberries)
- ○ Melons (cantaloupe, honeydew)
- ○ Cherries
- ○ Dates
- ○ Figs
- ○ Grapefruit
- ○ Grapes
- ○ Kiwis
- ○ Lemons or Limes
- ○ Mangos
- ○ Nectarines
- ○ Oranges
- ○ Papaya
- ○ Peaches
- ○ Pears
- ○ Pineapple
- ○ Plums
- ○ Prunes
- ○ Raisins
- ○ Rhubarb
- ○ Strawberries
- ○ Tangerines
- ○ Watermelon
- ○ Other (please specify) _____
- ○ MY CHILD DOES NOT eat fruit

86. During the *past year*, which vegetables did YOUR CHILD *usually* eat?
(Choose all that apply - you can choose more than one)

- ○ Asparagus
- ○ Avocados
- ○ Beets
- ○ Broccoli
- ○ Brussels Sprouts
- ○ Cabbage
- ○ Carrots
- ○ Cauliflower
- ○ Chayote
- ○ Corn
- ○ Cucumbers
- ○ Eggplant
- ○ Greens (collard, mustard, turnip)
- ○ Green Beans
- ○ Green Peas
- ○ Lettuce (all varieties)
- ○ Mushrooms
- ○ Okra
- ○ Onions
- ○ Peppers (bell, yellow, green, orange, or red)
- ○ Potatoes
- ○ Spinach
- ○ Summer Squash (yellow, zucchini)
- ○ Sweet Potatoes
- ○ Tomatoes
- ○ Tomatillos
- ○ Winter Squash (acorn, pumpkin)
- ○ Other (please specify) _____
- ○ MY CHILD DOES NOT eat vegetables

Please choose the best answer for each of the following statements:	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
87. I am willing to give MY CHILD who is two years or older 2% milk.	○	○	○	○	○
88. I am willing to give MY CHILD who is two years or older 1% milk.	○	○	○	○	○
89. I am willing to give MY CHILD who is two years or older skim milk (fat free).	○	○	○	○	○

90. Do YOU have a CHILD one year or older who receives WIC foods?
○ Yes ○ No

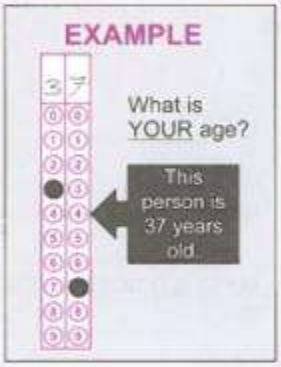
91. If YES, did YOUR CHILD receive WIC foods in the past 30 days?
○ Yes ○ No

92. Are you the PRIMARY CAREGIVER for this CHILD?
○ Yes ○ No

93. Is this CHILD a:
○ Boy ○ Girl

94. What is this CHILD'S age?
Years ① ② ③ ④ Months ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

By using the example below, please answer the following questions:



95. What is YOUR age?

96. What is YOUR Zip code?

97. What language is spoken MOST OFTEN at home? *(Choose one only)*
○ English ○ Both Spanish and English ○ Spanish ○ Other (Please specify) _____

98. What is YOUR race? *(Choose all that apply - you can choose more than one)*
○ White, non-Hispanic ○ Native American, non-Hispanic ○ Asian, non-Hispanic ○ I DO NOT want to answer
○ White, Hispanic ○ Native American, Hispanic ○ Asian, Hispanic
○ Black, non-Hispanic ○ Pacific Islander, non-Hispanic ○ Other (Please specify) _____
○ Black, Hispanic ○ Pacific Islander, Hispanic

99. What is the highest level of education YOU have completed?
○ 1st - 6th grade ○ High School graduate ○ Associate's degree or Technical College degree
○ 7th - 9th grade ○ GED ○ Bachelor's degree or higher
○ 10th - 12th grade ○ Some College

YOU HAVE FINISHED THIS SURVEY.
PLEASE COMPLETE ANY ADDITIONAL (Women or Infants) SURVEYS AS NEEDED. THANK YOU!

PLEASE DO NOT WRITE IN THIS AREA

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Appendix B. NATFAN Implementation Dates

Program	Surveys implementation dates (2009) (Before)	Month of Implementation of new food package (2009)	Survey implementation dates (2010-2011)(After)
Alabama	June-August	October	July-September
Alaska	June-August	October	August-February
Arizona	February-June	October	June -January
Arkansas	June-August	October	July- September
California	March-April	October	July-September
Colorado	February-June	June	July-September
Connecticut	June-August	October	July-September
Florida	June-July	October	June- August
Georgia	April-June	October	June-November
Hawaii	June-July	October	July -January
Idaho	June-August	October	July-September
Illinois	March-April	August	July-September
Indiana	April-May	October	July- October
Iowa	May-June	October	June- August
Kansas	March-April	August	June-September
Kentucky	April-July	May	June-September
Maryland	May-June	October	June-October
Massachusetts	May-July	October	August-December
Mississippi	May-June	October	August-October
Missouri	April-August	October	July-September
Montana	May-August	November	July-September
Nebraska	April-May	October	July-September
Nevada	June-August	October	July – November
New Hampshire	March-July	October	May-September

Program	**Surveys implementation dates (2009) (Before)**	**Month of Implementation of new food package (2009)**	**Survey implementation dates (2010-2011)(After)**
New Jersey	April-July	October	July-October
New Mexico	February-April	October	August-November
North Carolina	July-August	October	August-October
Ohio	X	October	May-November
Oregon	April-June	August	July-October
Pennsylvania	February-April	October	July-September
Rhode Island	X	October	July-September
South Dakota	March-April	September	June-August
Tennessee	June-August	October	July-October
Texas	December 08 – February 09	October	June-September
Vermont	April-August	October	June-September
Virginia	June-September	October	July-October
Washington	May-September	October	July-October
West Virginia	April-June	October	May-September
Wisconsin	May-August	August	June-October
Wyoming	June-September	October	August-November
Washington DC	June-July	October	May-August
Mariana Islands	March-May	October	June-September
Indian Tribal Organizations	March-August	October	May-November

Appendix C. NATFAN Benchmarks

The NATFAN benchmarks were developed to provide reference points for interpretation and assessment of whether the consumption reported by NATFAN respondents for five key food items or groups: milk, fruits, vegetables, whole grain products, juice, and baby foods were in alignment with dietary recommendations. These five "key elements" were recommended for more detailed reporting by the NATFAN advisory panel of State WIC Program Directors because these items are all foods that were added or changed in the revised WIC food packages to address excessive or inadequate intake of priority nutrients. Since NATFAN questionnaires collected food frequency consumption information (rather than amount) for many of the food items, direct comparison of the consumption frequency reported by NATFAN respondents to recommended dietary consumption for these food items is not possible. The benchmarks provide summaries of the dietary recommendations for various items, and include rough conversions of "frequency to amount" assuming that one serving would be eaten each "time" an item is consumed. The conversions are not meant to be used for scientific assessment of food amounts using NATFAN data for frequencies.

Table 1. NATFAN Benchmarks for Women and Children Food Groups of Interest			
Key Food Item	**Daily Recommended Amounts**	**NATFAN Benchmark**	**Comments/Assumptions***
Milk	Women - 3 cups/day Child (2- 4y) - 2-2½ cups/day Child (1y)[a] - 2 cups/day	3 cups/day for women 2-2 1/2 cups/day 2 cups/day or 2-3 breast feedings	NATFAN surveys obtained amounts and frequencies reported for this item.
Fruits	Women- 1½ - 2 cups/day Child (2- 4y) - 1-1½ cups/day Child (1y) a - 1 cup/day	2 or more times/day 2 or more times/day 2 or more times/day	*adult serving size = 1 cup *child (2-4y): serving size= ½ cup *child (1 y): serving size= ¼ cup [a]
Vegetables	Women - 2-2 ½ cups/day Child (2-4y) – 1-1 ½ cups /day Child (1y) a – 1 cup/day	3 or more times/day 2 or more times/day 3 or more times/day	*adult serving size = 1 cup *child (2-4y): serving size= ½ cup *child (1 y): serving size= ¼ cup
Whole grains	Women - 3 oz. eq./day Child (2- 4y) - 1 ½ - 2 ½ oz. eq./day Child (1y) a - 1 ½ oz. eq./day	2 or more times/day 1 or more times/day 1 or more times/day	[b] based on 1 slice of whole wheat bread, or ½ cup of cooked brown rice being equal to 1oz. equivalent of whole grain.
Juice	Make most of your choices whole or cut-up fruit rather than juice, for the benefits dietary fiber provides	Eliminate intake or 100% fruit or vegetable juice 1 time per day or less	Eliminate intake or limit intake of fruit juice to 4-6 fl. oz./day for children ages 1-6 years old and 6-11 fl. oz./day for women (*Time for a Change*, pg. 78, Table 3-1)

[a] Since there are few portion size recommendations for one year old children, daily recommendations were constructed from multiple sources including USDA's website http://www.fns.usda.gov/cnd/care/programbasics/meals/meal_patterns.htm, and guidebook, *Infant Nutrition and Feeding, A Guide for Use in the WIC and CSF Programs*, AAP's *Pediatric Nutrition Handbook, 6th Edition* and IOM's *WIC Food Packages, Time for a Change.*

[b] Women would have to eat 2 slices of bread or ½ cup cooked brown rice 1.5 times/day to meet recommendation; children would have to eat 1 slice of bread or ¼ cup of brown rice 1.5 times/day to meet the recommendation. (http://www.choosemyplate.gov/food-groups/grains-counts.html)

Table 2. NATFAN Benchmarks for Infant Food Groups of Interest

Age of Infant[a]	Breast Milk[b]	Infant Formula[c]	Meats and Protein Rich Foods	Grain Products	Fruit	Vegetables	Juice[d]
Less than 1month	8-12+ Feedings	14-42 oz.	None	None	None	None	None
1-2 months	8-12+ Feedings	14-42 oz.	None	None	None	None	None
3-4 months	8-12+ Feedings	14-42 oz.	None	None	None	None	None
5 months	5 or more feedings	26-39 oz.	None	None	None	None	None
6 months	3-5 feedings	24-32 oz.	Plain Strained or pureed cooked protein- rich foods (1-2 Tbsp)	Iron-Fortified infant cereal (4-5 Tbsp)	Plain strained or pureed fresh or cooked fruit (1-2 Tbsp)	Plain strained or pureed fresh or cooked vegetables (1-2 Tbsp.)	Eliminate or 100% pasteurized fruit or vegetable juice (2-4 oz.)
7-8 Months	3-5 feedings	24-32 oz.	Plain Strained or pureed cooked protein- rich foods (1-2 Tbsp)	Iron-Fortified infant cereal (4-6 Tbsp) Other grain products (4-6 Tbsp)	Plain strained or pureed fresh or cooked fruit (3-4 Tbsp)	Plain strained or pureed fresh or cooked vegetables (3-4 Tbsp.)	Eliminate or 100% pasteurized fruit or vegetable juice (2-4 oz.)
9-10 months	3-4 feedings	24-32 oz.	Plain Strained or pureed cooked protein- rich foods (1-3 Tbsp)	Iron-Fortified infant cereal (4-6 Tbsp) Other grain products (4-6 Tbsp)	Plain strained or pureed fresh or cooked fruit (3-4 Tbsp)	Plain strained or pureed fresh or cooked vegetables (3-4 Tbsp.)	Eliminate or 100% pasteurized fruit or vegetable juice (2-4 oz.)
11 months	3- 4 feedings	24-32 oz.	Plain Strained or pureed cooked protein- rich foods (1-3 Tbsp)	Iron-Fortified infant cereal (4-6 Tbsp) Other grain products (4-6 Tbsp)	Plain strained or pureed fresh or cooked fruit (3-4 Tbsp)	Plain strained or pureed fresh or cooked vegetables (3-4 Tbsp.)	Eliminate or 100% pasteurized fruit or vegetable juice (2-4 oz.)

Notes:
[a] Age categories are based on the age categories options in NATFAN questionnaire.
[b] *Pediatric Nutrition Handbook pg. 42; Breastfeeding and the Use of Human Milk,* 2012
[c] *Infant Nutrition and Feeding: A Guide for Use in the WIC and CSF Programs*, Ch. 1 (http://www.nal.usda.gov/wicworks/Topics/FG/Chapter1_NutritionalNeeds.pdf)
[d] no longer offered to infants as a WIC food benefit for this age group